

# The genus *Paraplonobia* Wainstein and *Neopetrobia* Wainstein (Acari, Trombidiformes, Tetranychidae) from Saudi Arabia: new species, new records and key to the world species of *Paraplonobia*

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Academic editor: Vladimir Pesic | Received 1 May 2016 | Accepted 19 May 2016 | Published 14 June 2016

<http://zoobank.org/D3CA0DC2-7308-4F30-9A0C-90B0355981E5>

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**Citation:** Kamran M, Mirza JH, Alatawi FJ (2016) The genus *Paraplonobia* Wainstein and *Neopetrobia* Wainstein (Acari, Trombidiformes, Tetranychidae) from Saudi Arabia: new species, new records and key to the world species of *Paraplonobia*. ZooKeys 598: 27–55. doi: 10.3897/zookeys.598.9060

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## Abstract

The two tetranychid genera *Paraplonobia* Wainstein and *Neopetrobia* Wainstein (Trombidiformes: Tetranychidae) are reported for the first time from Saudi Arabia. Three new species *Paraplonobia (Anaplonobia) arabica* Mirza & Alatawi, sp. n., *P. (A.) haloxylonia* Alatawi & Mirza, sp. n. and *P. (A.) tabukensis* Kamran & Alatawi, sp. n. are described and illustrated based on adult females, collected from *Prosopis juliflora* (SW.) Dc. (Fabaceae) and *Haloxylon salicornicum* Bunge (Amaranthaceae) from two different regions of Saudi Arabia. *Neopetrobia mcgregori* (Pritchard and Baker) is redescribed and illustrated based on female collected from *Cynodon dactylon* L. (Poaceae). The diagnostic morphological features including leg chaetotaxy of all known species of the subgenus *Anaplonobia* is tabulated. A key to the world species of the genus *Paraplonobia* is also provided.

## Keywords

*Hystrichonychini, arabica, haloxylonia, tabukensis, Prosopis*

## Introduction

The genus *Paraplonobia* Wainstein belongs to the tribe Hystrichonychini Pritchard and Baker of the subfamily Bryobinae (Acari: Prostigmata: Tetranychidae). Wainstein (1960) considered *Anaplonobia* and *Paraplonobia* as subgenera of *Aplonobia* Womersley. Later, Tuttle and Baker (1968) proposed *Anaplonobia* and *Paraplonobia* as two valid genera. After that, Gutierrez (1985) categorized the genus *Paraplonobia* into three subgenera: *Anaplonobia* Wainstein, *Brachynychus* Mitrofanov & Strunkova and *Paraplonobia* Wainstein on the basis of coxal setal count and the aspect of peritremes and considered the genus *Anaplonobia* as subgenus of *Paraplonobia* (Gutierrez 1985).

The genus *Paraplonobia* includes 32 species to date, which are widely distributed throughout the world. The subgenera *Anaplonobia*, *Paraplonobia*, and *Brachynychus* include 22, nine and one species, respectively (Baker and Tuttle 1972, Meyer 1987, Bolland et al. 1998, Migeon and Flechtmann 2004).

The subgenera *Anaplonobia* and *Paraplonobia* have a coxal setal formula of 2–2–1–1 while the subgenus *Brachynychus* has a coxal setal formula of 4–3–2–2. The subgenus *Anaplonobia* differs from *Paraplonobia* by having anastomosed peritremes while the later has simple peritremes (Gutierrez 1985, Bolland et al. 1998).

The genus *Neopetrobia* also belongs to the tribe Hystrichonychini and morphologically closely resembles the genus *Paraplonobia* except for the fourth pair of dorsocentral setae  $f_1$  which are widely spaced as compared to setae  $c_1$ , while  $f_1$  setae are normally spaced as  $c_1$  in *Paraplonobia* (Meyer 1987, Bolland et al. 1998). The genus *Neopetrobia* has been categorized into three subgenera; *Neopetrobia*, *Reckia* Wainstein and *Langella* Wainstein (Gutierrez 1985, Bolland et al. 1998). The subgenus *Neopetrobia* is different from other two subgenera by having integument without tuberculate or reticulate pattern and rounded or spindle shaped dorsal setae and includes ten species to date (Bolland et al. 1998).

A few tetranychid species have been reported from Saudi Arabia (SA): *Bryobia praetiosa* Koch, *Eotetranychus fallugiae* Tuttle & Baker, *Eutetranychus orientalis* (Klein), *E. palmatus* Attiah, *Oligonychus afrasiaticus* (McGregor), *O. pratensis* (Banks), *Tetranychus cinnabarinus* (Boisduval), *T. turkrestzni* (Ugarov & Nikolskii), and *T. urticae* (Koch) (Martin 1972, Alatawi 2011). The genus *Paraplonobia* is poorly known from Arabian peninsula. Previously, two species *P. (A.) harteni* Meyer and *P. (P.) dactyloni* Smiley & Baker were reported from Yemen (Meyer 1996; Smiley and Baker 1995).

Two genera, *Paraplonobia* and *Neopetrobia*, are reported upon for the first time from Saudi Arabia with three new species: *Paraplonobia (Anaplonobia) arabica* sp. n., *P. (A.) haloxylonia* sp. n. and *P. (A.) tabukensis* sp. n. which are described and illustrated based on adult females. The male of *P. (A.) haloxylonia* sp. n. is also described and illustrated. *Neopetrobia mcgregori* (Pritchard & Baker) is redescribed and illustrated based on female.

Diagnostic features of all known species of the subgenus *Anaplonobia* are provided including body morphological features, leg I length in comparison to body length, and leg chaetotaxy (Tables 1 and 2) as well as a key to the world species of the genus *Paraplonobia*.

**Table I.** Some morphological diagnostic features of the world species of the subgenus *Anaplonobia*, genus *Paraplonobia*.

Species	Distribution	Dorsal setae			Dorsal Striations		Stylophore anteriorly	Peritremes
		Shape	Distance of dorso-central hysterosomal setae especially (c1, d1, e1) to the setae next in line	Hysterosoma medially	Propodosomal shield			
<sup>3</sup> <i>P. (A.) acharis</i> (Pritchard & Baker, 1955)	USA	slightly lanceolate	distinctly shorter	widely spaced transverse	dashed, weak, longitudinal	rounded	weak with two irregular branches	
<sup>7</sup> <i>P. (A.) algarrobicola</i> (Gonzalez, 1977)	Chile	subspatulate, on tubercles	distinctly shorter	widely spaced transverse	longitudinal	rounded	anastomose	
<sup>3</sup> <i>P. (A.) ambrosiae</i> (Tuttle, Baker & Abbiatiello, 1976)	Mexico, USA	slender/ setiform	distinctly shorter	widely spaced transverse	tuberculate longitudinal	-	ball like anastomose	
<sup>7</sup> <i>P. (A.) arabica</i> Mirza & Alatawi, sp. n.	Jazan, Riyadh, Tabuk	subspatulate, e-f on small tubercles	distinctly shorter	widely spaced transverse	weak, irregular, longitudinal	slightly incised	elongate anastomose	
<sup>9</sup> <i>P. (A.) boutelouae</i> Tuttle & Baker, 1968	USA	subspatulate	distinctly shorter	close spaced transverse	-	-	anastomose	
<sup>3</sup> <i>P. (A.) brickellia</i> Baker & Tuttle, 1972	USA	subspatulate	distinctly shorter	widely spaced transverse	strong tubercles/lobes	round, tapering distally	strongly rounded, anastomose	
<sup>7</sup> <i>P. (A.) candicans</i> (Meyer, 1974)	South Africa	subspatulate, on tubercles	distinctly shorter	widely spaced transverse	medially wide spaced longitudinal, remaining dashed	slightly incised	complex anastomose	
<sup>9</sup> <i>P. (A.) concolor</i> Chaudhri, Akbar & Rasool, 1974	Pakistan	lanceolate	distinctly shorter	close spaced transverse	weak transverse	deeply incised	anastomose	
<sup>9</sup> <i>P. (A.) contiguous</i> (Chaudhri, Akbar & Rasool, 1974)	Pakistan	lanceolate	distinctly shorter	close spaced transverse	dotted longitudinal	slightly incised	weak branched anastomose	
<sup>9</sup> <i>P. (A.) daryaensis</i> Chaudhri, Akbar & Rasool, 1974	Pakistan	lanceolate	distinctly shorter	close spaced transverse	irregular, weak, longitudinal, medially transverse	slightly incised	anastomose	
<sup>9</sup> <i>P. (A.) glebulenta</i> (Meyer, 1974)	South Africa	lanceolate	distinctly shorter	Small tubercles making pattern	round	sausage anastomose		
<sup>2,9</sup> <i>P. (A.) haloxylonia</i> Alatawi & Mirza, sp. n.	Riyadh, KSA	lanceolate	distinctly shorter	weak, longitudinal	slightly incised	weak anastomose with few long thread like branches		

Species	Distribution	Shape	Dorsal setae		Dorsal Striations		Stylophore anteriorly	Peritremes
			Distance of dorso-central hysterosomal setae especially (c1, d1, e1) to the setae next in line	Hysterosoma medially	Propodosomal shield	Dashed, transverse		
<i>P. (A.) harteni</i> (Meyer, 1996)	Yemen	lanceolate	distinctly shorter	closely spaced transverse	slightly incised	weakly anastomose with few branches		
<sup>1</sup> <i>P. (A.) inornata</i> (Meyer, 1987)	South Africa	slender /setiform	distinctly shorter	widely spaced transverse	incised	weak branched anastomose		
<sup>7</sup> <i>P. (A.) prospis</i> (Tuttle & Baker, 1964)	Miami USA, Marigat, Kenya	subspatulate	distinctly shorter	widely spaced transverse	longitudinal	-	anastomose	
<sup>2</sup> <i>P. (A.) tabukensis</i> Kamran & Alatawi, sp. n.	Tabuk, KSA	narrowly lanceolate	distinctly shorter	closely spaced transverse	weak, longitudinal	rounded	small, compact, anastomose	
<sup>9</sup> <i>P. (A.) theroni</i> (Meyer, 1974)	South Africa	lanceolate, on tubercles	distinctly shorter	closely spaced transverse	dashed fine longitudinal	slightly incised	elongate anastomose	
<sup>8</sup> <i>P. (A.) allionia</i> Baker & Tuttle, 1972	USA	slender/ setiform	as long as/ slightly longer	closely spaced transverse	strong tuberculate longitudinal	rounded	small, elongate anastomose bulb	
<sup>3</sup> <i>P. (A.) calame</i> (Pritchard & Baker, 1955)	USA	slender/ setiform, on small tubercles	as long as/ slightly longer	widely spaced transverse	pebbled	rounded	three chambered branches	
<sup>5</sup> <i>P. (A.) coldinae</i> (Tuttle & Baker, 1964)	USA	slender/setiform	much longer	-	-	rounded	anastomose	
<sup>7</sup> <i>P. (A.) juliflora</i> (Tuttle & Baker, 1968)	USA	subspatulate on small tubercles	longer	widely spaced tuberculate striate	tuberculate striate	rounded	Weak branched anastomose	
<sup>3</sup> <i>P. (A.) artemisia</i> Baker & Tuttle, 1972	Mexico, USA	slender, blunt distally	as long as/ slightly longer	widely spaced tuberculate fold, transverse	broken, irregular, longitudinal	rounded	elongate anastomose bulb	
<sup>4</sup> <i>P. (A.) berberis</i> Baker & Tuttle, 1972	USA	slender/setiform	as long as/ slightly longer	widely spaced broad folds with tubercles	small tubercles	rounded	small anastomose bulb	
<sup>6,7</sup> <i>P. (A.) euphorbiae</i> (Tuttle & Baker, 1964)	Mexico, USA	subspatulate	slightly shorter/as long as	irregular transverse	basket weave	rounded	anastomose	
<sup>9</sup> <i>P. (A.) tschepensis</i> (Meyer, 1974)	South Africa	spatulate, on tubercles	longer	closer spaced transverse	broken longitudinal	deeply incised	oval anastomose	

Host Plant Family: 1. Acanthaceae, 2. Asteraceae, 3. Amaranthaceae, 4. Berberidaceae, 5. Boraginaceae, 6. Euphorbiaceae, 7. Fabaceae, 8. Nyctaginaceae, 9. Poaceae

**Table 2.** Length of leg I and leg chaetotaxy of world species of subgenus *Anaplonobia* genus *Paraplonobia*.

## Materials and methods

The mite specimens were collected by shaking the plant parts, especially leaves, onto a white sheet of paper. Mites found moving on paper were collected with the help of a camel hairbrush and preserved in small vials containing 70% ethanol. Preserved mite specimens were observed under a stereomicroscope (SZX10, Olympus, Tokyo, Japan) and mounted on glass slides in Hoyer's medium. The mounted specimens were examined under phase contrast microscope (DM2500, Leica, Wetzlar, Germany). Different body parts were pictured using an auto montage software system (Syncroscopy, Cambridge, UK), then drawn with Adobe Illustrator (Adobe System Inc., San Jose, CA, USA). All measurements are in micrometers. The terminology used in this paper follows that of Lindquist (1985). All type specimens were deposited at Acarology Laboratory, Department of Plant Protection, College of Food and Agricultural Sciences, King Saud University except one each of female and male paratypes of *Paraplonobia* (*Anaplonobia*) *haloxylonia* sp. n., female paratype each of *P. (A.) arabica* sp. n., and *P. (A.) tabukensis* sp. n., with Accession numbers, OSAL 0115769, OSAL 00115768, OSAL 0110333 and OSAL 0110332 respectively, that were deposited at Ohio State University Acarology Laboratory (OSAL), USA.

## Results and discussion

**Family Tetranychidae Donnadiet  
Subfamily Bryobinae Berlese**

### Genus *Paraplonobia* Wainstein, 1960

*Aplonobia* (*Paraplonobia*) Wainstein, 1960: 140.

*Paraplonobia*: Tuttle and Baker 1968: 48, Meyer 1974: 119, Chaudhri et al. 1974: 28, Gutierrez 1985: 75, Bolland et al. 1998: 7.

**Type species.** *Aplonobia* (*Paraplonobia*) *echinopsili* Wainstein, 1960 by original designation.

**Diagnosis.** Based on Baker and Tuttle 1968, Gutierrez 1955, Meyer 1974, Meyer 1987, Bolland et al. 1998.

Body oval; prodorsum without lobes and with three pairs of setae; dorsal opisthosomal setae ten pairs. Dorsal setae not set on prominent tubercles; setae  $f_1$  normal in position, coxal setal formula variable, most species with 2–2–1–1 except one species of the subgenus *Brachynychus* having 4–3–2–2 setae on coxae I–IV respectively; anal setae three pairs; peritremes simple/anastomosing; tarsus I with two sets of duplex setae, present close to distal end of tarsus; claws and empodium pad-like each with tenant hairs (Fig. 5A).

## Subgenus *Anaplonobia* Wainstein

**Diagnosis.** Based on Gutierrez 1985, Bolland et al. 1998.

Peritremes anastomosed, coxal setal formula 2–2–1–1.

The subgenus *Anaplonobia* includes 22 species (Migeon and Flechtmann 2004). The species of the subgenus *Anaplonobia* can be grouped into two categories: 1) Eight species with dorsal body setae slightly shorter/as long as or longer than distances to the bases of consecutive setae (Tables 1 and 2), second group with dorsal body setae distinctly shorter than distances between their bases, contains 17 species including three new species (*P. (A.) arabica* sp. n., *P. (A.) haloxylonia* sp. n., and *P. (A.) tabukensis* sp. n.) reported in this study (Table 1, 2).

Shape of setae (spatulate, subspatulate, lanceolate or setiform), comparative length of setae with respect to the distance of setae next behind, shape of peritremes (compact anastomose, branched or weakly anastomosed), propodosomal shield (pebbled, lobbed, with longitudinal/transverse striations), hysterosoma (medially with closely/widely spaced striations), comparative length of leg I with respect to body length (shorter/longer) and leg chaetotaxy are the major diagnostic characters vary among/within the species of subgenus *Anaplonobia* (Table 1, 2).

Most species of the subgenus *Anaplonobia* have been reported from USA, Mexico, South Africa and Pakistan and collected mostly from three host plants families Asteraceae, Fabaceae and Poaceae (Bolland et al. 1998) (Table 1).

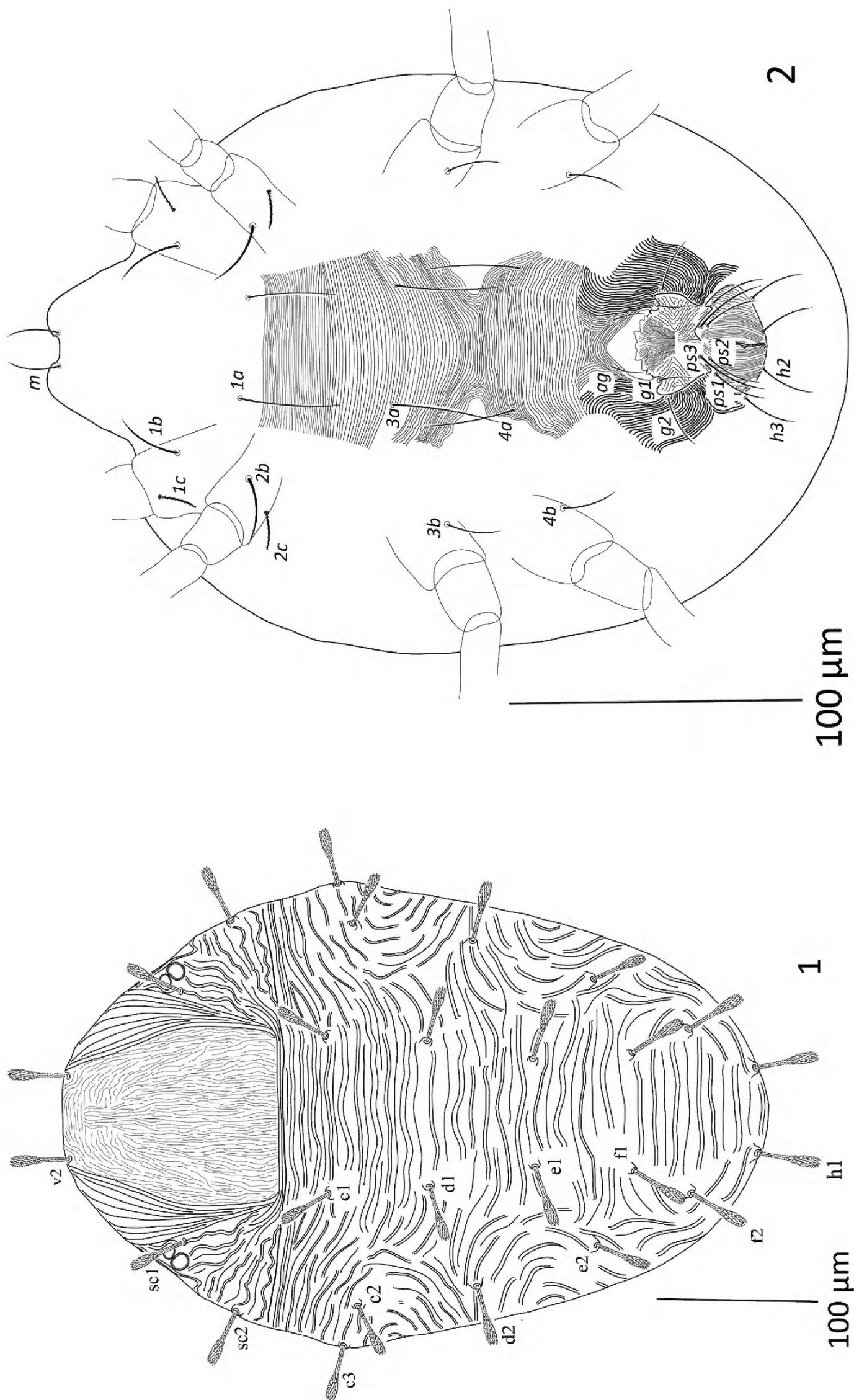
The specimens of new species *P. (A.) arabica* sp. n., collected from *Prosopis juliflora* from three different regions (Riyadh, Tabuk, and Jazan) of Saudi Arabia, are morphologically similar except for some variations in setal counts on Tibia II and Tarsus I–II–III. (Table 2). The variations in the setal count of leg I–II–IV (Tibia and Tarsus) in *P. (A.) prosopis* had been found also in the description made by Tuttle and Baker (1964) from USA and Toroitich and Ueckermann (2009) from Kenya (Table 2). However, in some other species of the subgenus *Anaplonobia*, setal variations on genua, tibiae and tarsi have been found among the different specimens collected from the same host and location within the same species. i.e. genua I (8–9) in *P. (A.) candicans*, tibia I (12–13) and tarsus II (12–13) of *P. (A.) glebulanta*, and tarsus III (12–13) of *P. (A.) theroni* (Table 2).

### *Paraplonobia (Anaplonobia) arabica* sp. n.

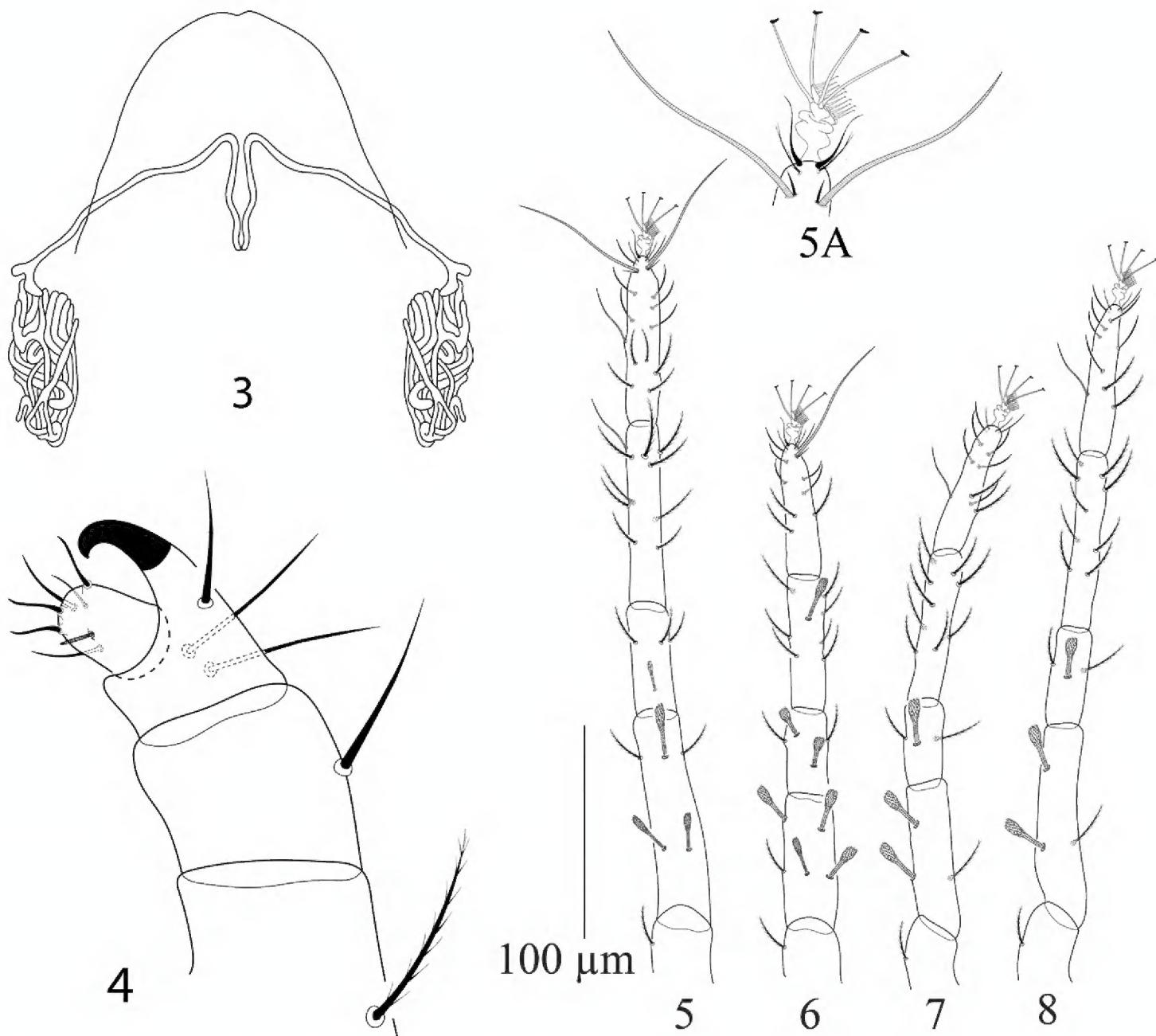
<http://zoobank.org/200D2E10-9324-4C31-8B04-F08C8F33EBD1>

Figs 1–8

**Diagnosis.** Dorsal body setae subspatulate, serrate, expanded distally and distinctly shorter to the distances of setae next in line, first pair of dorsocentral setae c<sub>1</sub> reaching 2/3 to the distance of setae d<sub>1</sub>, setae c<sub>1</sub> almost 1.5 times widely spaced than setae f<sub>1</sub>, setae e<sub>2</sub>, f<sub>1</sub>, f<sub>2</sub> and h<sub>1</sub> set on small tubercles, dorsal hysterosomal striations widely spaced, propodosoma medially with longitudinal broken striations, stylophore with a



**Figures 1, 2.** *Paraplonobia (Anaplonobia) arabica* sp. n. adult female. 1 dorsum 2 venter.



**Figures 3–8.** *Paraplonobia (Anaplonobia) arabica* sp. n. adult female. **3** stylophore and peritremes **4** palp **5** leg I **5A** duplex setae, empodium and claws of tarsus I **6** legII **7** legIII **8** leg IV.

small mediocephalic emargination, peritremes branched tube like compact anastomosing, leg I shorter than body length.

**Description of holotype female** ( $n = 9$ ). Measurement of holotype followed by 8 paratypes (in parenthesis) (Figs 1–8).

**Dorsum** (Fig. 1). Body oval; length of idiosoma 439 (430–443), maximum width 282 (280–287), length of body (gnathosoma + idiosoma) 476 (472–480). Propodosoma medially with longitudinal broken striations, without anterior projections. Dorsal body setae subspatulate, serrate, expanded distally and distinctly shorter to the distances of setae next in line, first pair of dorsocentral setae c<sub>1</sub> reaching 2/3 to the distance of setae d<sub>1</sub>, setae c<sub>1</sub> almost 1.5 times widely spaced than setae f<sub>1</sub>, setae e<sub>2</sub>, f<sub>1</sub>, f<sub>2</sub> and h<sub>1</sub> set on small tubercles. Dorsal striations transverse on hysterosoma, without lobes and widely spaced. Length of dorsal setae: v<sub>2</sub> 45 (42–46), sc<sub>1</sub> 40 (38–41), sc<sub>2</sub> 41 (40–43), c<sub>1</sub> 45 (44–48), c<sub>2</sub> 42 (40–44), c<sub>3</sub> 40 (39–44), d<sub>1</sub> 34 (32–38), d<sub>2</sub> 44 (43–46), e<sub>1</sub> 45 (44–48), e<sub>2</sub> 44 (43–45), f<sub>1</sub> 45 (44–45), f<sub>2</sub> 44 (42–45), h<sub>1</sub> 46 (45–48). Distance between dorsal setae: v<sub>2</sub>–v<sub>2</sub> 53 (51–55), v<sub>2</sub>–sc<sub>1</sub> 97

(95–98),  $sc_1-sc_2$  56 (54–57),  $sc_1-sc_1$  166 (162–167),  $sc_2-sc_2$  263 (260–266),  $c_1-c_1$  94 (92–96),  $c_1-c_2$  82 (80–85),  $c_2-c_3$  41 (39–44),  $c_2-c_2$  261 (260–264),  $c_3-c_3$  345 (340–346),  $d_1-d_1$  82 (80–84),  $d_1-d_2$  81 (80–82),  $d_2-d_2$  226 (224–228),  $c_1-d_1$  75 (74–78),  $c_3-d_2$  97 (95–99),  $e_1-e_1$  63 (61–65),  $e_1-e_2$  78 (74–79),  $e_2-d_2$  85 (83–86),  $e_2-e_2$  79 (75–79),  $f_1-f_1$  63 (60–65),  $f_2-f_2$  107 (105–108),  $f_1-f_2$  53 (50–54),  $f_1-d_1$  69 (66–70),  $h_1-h_1$  57 (55–59).

**Venter** (Fig. 2). Idiosoma ventrally with transverse striations from setae 1a to 3a; most of the area between 3a to 4a is transverse with few V-shaped striations laterally; transverse posterior to setae 4a; striations transverse regular anterior to aggenital setae (ag). The intercoxal setae 1a slightly longer than the distance 1a–1a. The intercoxal setae 3a just equal to distance 3a–3a. The intercoxal setae 4a 4/5 to the distance 4a–4a. Length of intercoxal and coxal setae: 1a 39 (35–40), 3a 52 (51–55), 4a 50 (48–52), 1b 54 (52–56), 1c 18 (16–20), 2b 37 (35–38), 2c 21 (20–24), 3b 23 (21–25), 4b 38 (36–39); aggenital setae ag 48 (44–48), ag–ag 27 (25–28); genital setae two pairs,  $g_1$  32 (30–24),  $g_2$  40 (38–42),  $g_1-g_1$  40 (39–44),  $g_2-g_2$  56 (52–57),  $g_1-g_2$  12 (10–14); anal setae three pairs,  $ps_1$  21 (18–24),  $ps_2$  37 (35–39),  $ps_3$  58 (54–60),  $ps_1-ps_1$  33 (30–34),  $ps_2-ps_2$  26 (24–27),  $ps_3-ps_3$  19 (18–22); para-anal setae two pairs,  $h_2$  33 (31–34),  $h_2-h_2$  17 (16–18),  $h_3$  38 (35–40),  $h_3-h_3$  46 (45–48).

**Gnathosoma** (Figs 3–4). Stylophore elongate, slender and slightly notched anteriorly. Peritremes branched tube like compact anastomosing (Fig. 3). Scapular setae m 36 (34–37), m–m 32 (31–35). Palp femur and genu each with one seta, palp tibia with three setae, tibial claw strongly curved; palp tarsus with three setae, three eupathidia, one solenidion (Fig. 4).

**Legs** (Figs 5–8). Length of legs I–IV (without coxae) 336, 251, 276, 298 respectively. Leg I shorter than body length. Number of setae and solenidia (in parenthesis) on legs I–IV: coxae 2–2–1–1, trochanters 1–1–1–1, femora 5–5–3–3, genua 4–4–3–3, tibiae 9(1)–(8–9)–9–9; tarsi I with 12–14 tactile setae, two sets of duplex setae at distal end, two eupathidia and one/two solenidion; tarsi II with 8–9 tactile setae, one set of duplex setae, two eupathidia and one solenidion; tarsi III with 8–9 tactile setae and one solenidion; tarsi IV with 9 tactile setae and one solenidion. True claws pad like each with one pair of tenant hair; empodium pad-like with two rows of small tenant hairs.

**Male.** Not in collection.

**Etymology.** The specific epithet is derived from the region “Arabia” from where type specimens were collected.

**Type material.** Holotype and one paratype female, *P. juliflora* (Fabaceae), Deesa Valley, Dessa, Tabuk, SA, 27°36.048'N, 036°25.592'E, October, 18, 2015, coll. J.H. Mirza.; seven paratype females, *P. juliflora* (Fabaceae), Sharma, Near Red Sea, Tabuk, SA, 28°03.479'N, 035°17.186'E, October, 19, 2015, coll. M. Kamran.

**Remarks.** The *P. (A.) arabica* sp. n. relates to *P. (A.) prosopis* (Tuttle & Baker, 1964), *P. (A.) algarrobicola* (Gonzalez, 1977) and *P. (A.) boutelouae* Tuttle & Baker, 1968 because of sharing following similar characters: dorsal body setae spatulate and distinctly shorter to the distances of setae next behind and widely spaced dorsal hysterosomal striations. Also, the new species closely resembles *P. (A.) prosopis* by setae  $c_1$  at least reaching half distance to the bases of setae  $d_1$ . However, the new species differs

from all related species by having stylophore anteriorly with slight incision (notch). The new species is also distinguished from *P. (A.) prosopis* by setae  $c_1$  reaching to the distance of setae  $d_1$  (2/3 vs. 1/2), setae  $c_1-c_1$  almost 1.5 times widely spaced than setae  $f_1-f_1$  vs. almost sub/equally spaced in *P. (A.) prosopis*. The new species can be separated from other related species *P. (A.) algarrobicola* and *P. (A.) boutelouae* by the setae  $c_1$  reaching 2/3 to the distance of  $d_1$  vs. less than half as long as distances to the bases setae next behind in later species

***Paraplonobia (Anaplonobia) haloxylonia* sp. n.**

<http://zoobank.org/09E8353-E635-4C38-B277-8D6DDC56C31A>

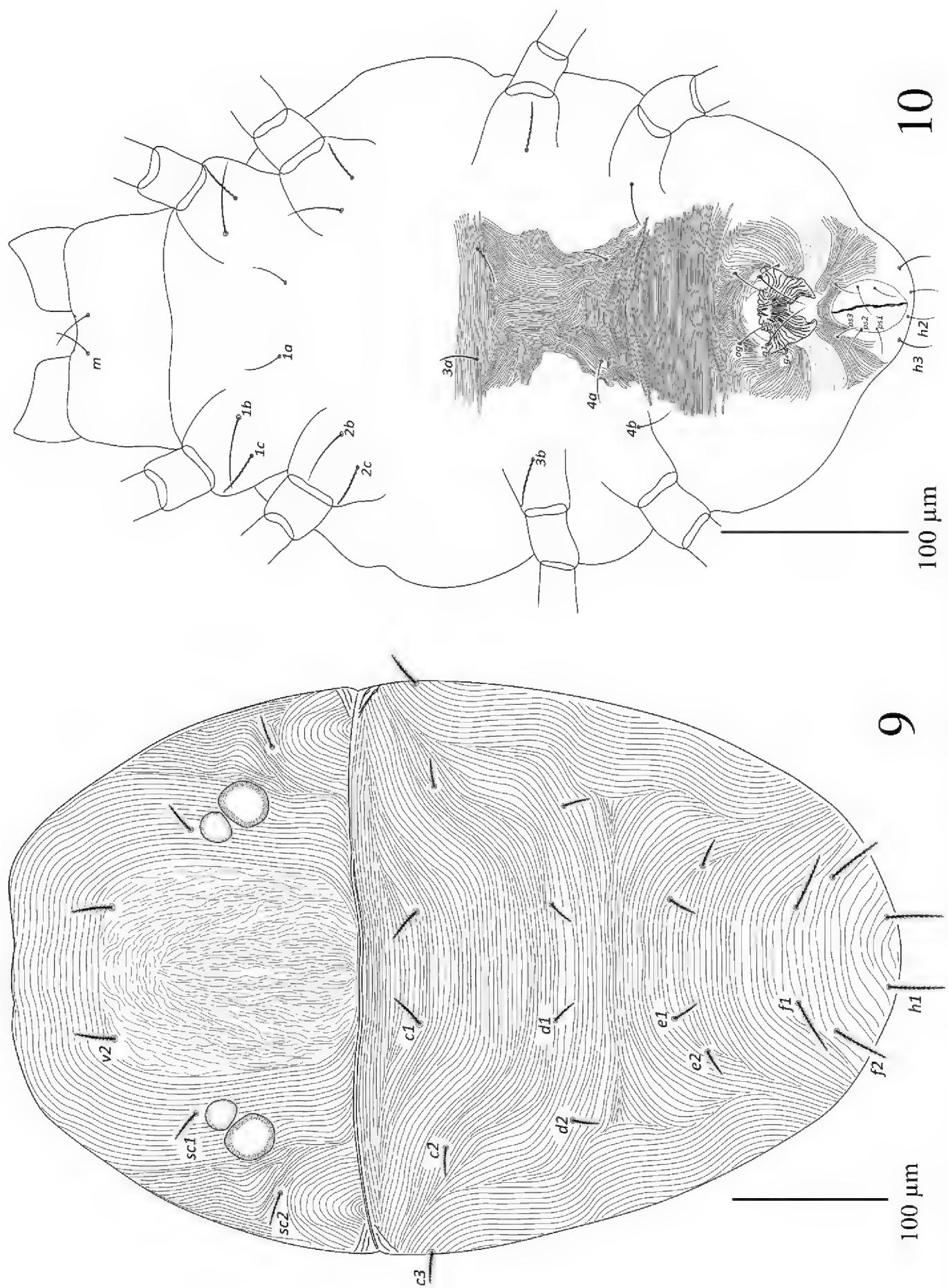
Figs 9–28

**Diagnosis.** Dorsal setae lanceolate, densely serrate, not set on tubercles and distinctly shorter to the distances of setae next behind, dorsocentral setae ( $c_1$ ,  $d_1$  and  $e_1$ ) almost 1/3 to the distance of setae next behind, propodosoma medially with weak, longitudinal irregular striations, hysterosoma with transverse and closely spaced striations medially, stylophore slightly notched anteriorly, peritremes anastomosed distally, with few long thread like branches, and hysterosomal striations closely spaced, leg I shorter than body.

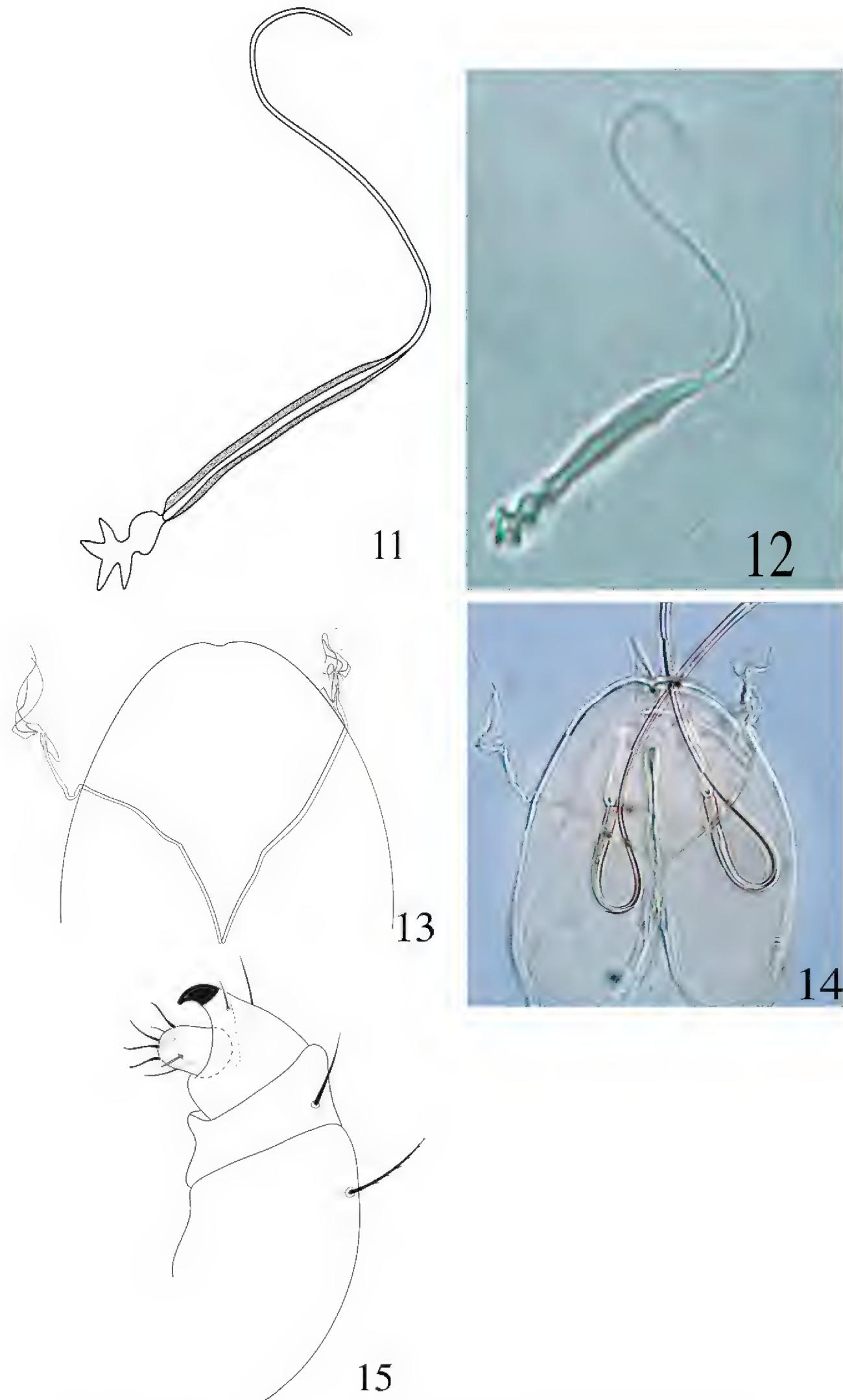
**Description of holotype female** (n = 39). Measurements of holotype followed by 38 paratypes (in parenthesis) (Figs 9–19).

**Dorsum** (Fig. 9). Body oval; length of idiosoma 583 (578–585), maximum width 372 (369–378), length of body (gnathosoma + idiosoma) 658 (655–663). Propodosoma medially with weak, longitudinal irregular striations; laterally longitudinal regular striations; hysterosomal striations medially transverse and closely spaced, laterally longitudinal irregular. Dorsal setae lanceolate, densely serrate, not present on tubercles and distinctly shorter to the distances of setae next behind, dorsocentral setae ( $c_1$ ,  $d_1$  and  $e_1$ ) almost 1/3 to the distance of setae next behind, Length of dorsal setae:  $v_2$  28 (26–29),  $sc_1$  24 (23–25),  $sc_2$  22 (21–24),  $c_1$  19 (18–21),  $c_2$  22 (21–23),  $c_3$  25 (24–28),  $d_1$  15 (12–16),  $d_2$  18 (17–19),  $e_1$  16 (15–17),  $e_2$  20 (19–20),  $f_1$  25 (24–28),  $f_2$  31 (29–32),  $h_1$  34 (32–35). Distance between dorsal setae:  $v_2-v_2$  72 (70–73),  $v_2-sc_1$  75 (72–78),  $sc_1-sc_2$  66 (63–67),  $sc_1-sc_1$  167 (163–172),  $sc_2-sc_2$  254 (250–259),  $c_1-c_1$  90 (88–92),  $c_1-c_2$  75 (71–78),  $c_2-c_3$  81 (78–85),  $c_2-c_2$  231 (229–234),  $c_3-c_3$  373 (372–375),  $d_1-d_1$  91 (89–92),  $d_1-d_2$  65 (62–69),  $d_2-d_2$  204 (201–206),  $c_1-d_1$  103 (100–104),  $c_3-d_2$  160 (158–161),  $e_1-e_1$  55 (53–57),  $e_1-e_2$  53 (50–54),  $e_2-d_2$  85 (82–86),  $e_2-e_2$  150 (148–152),  $f_1-f_1$  60 (59–62),  $f_2-f_2$  80 (78–83),  $f_1-f_2$  28 (25–29),  $f_1-d_1$  93 (91–94),  $h_1-h_1$  31 (28–32).

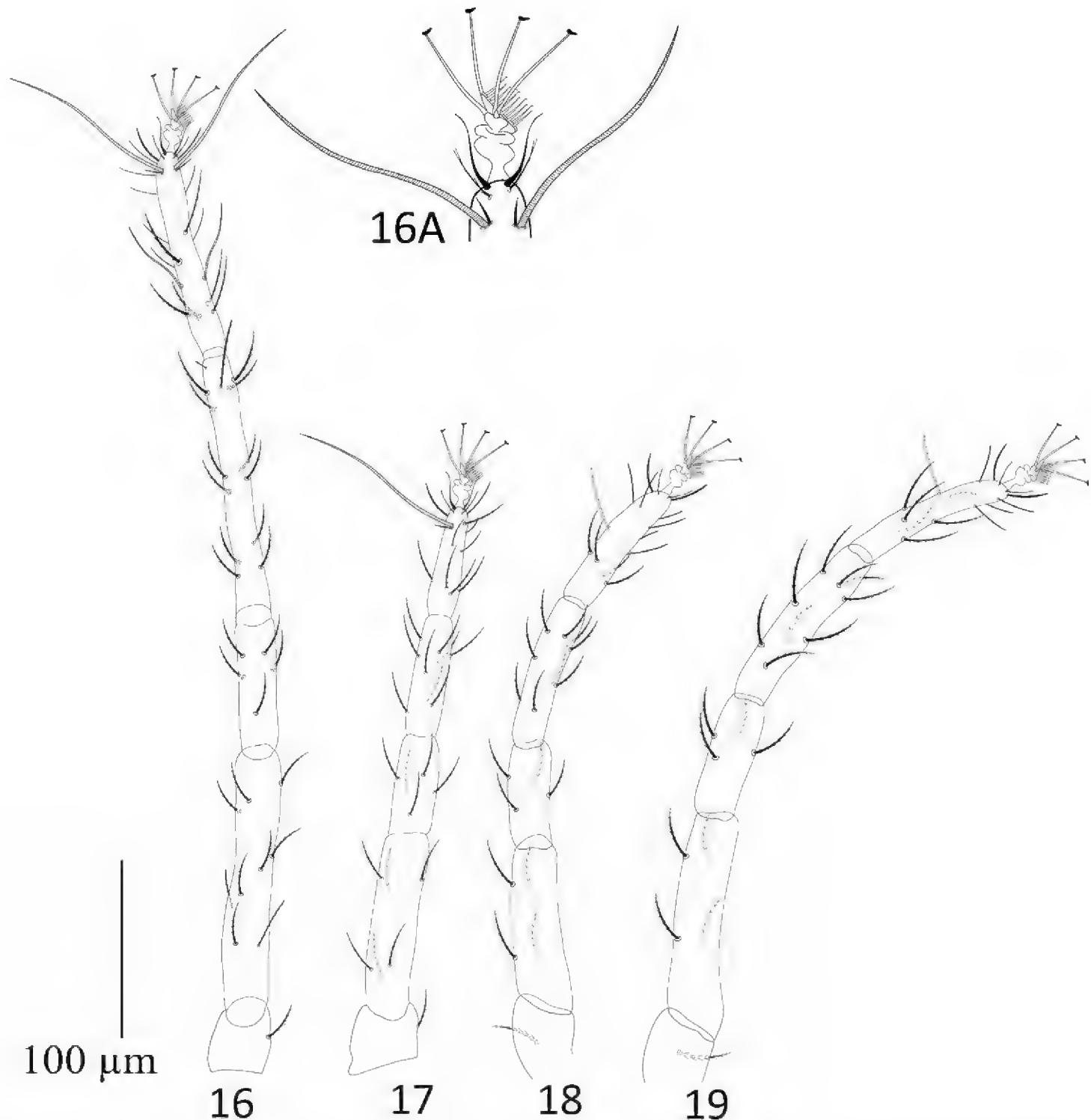
**Venter** (Figs 10–12). Idiosoma ventrally with transverse simple striations from setae 1a to 3a; longitudinal irregular between setae 3a and 4a; transverse posterior to setae 4a; striations longitudinal irregular anterior to aggenital setae (ag). Length of intercoxal and coxal setae: 1a 25 (24–26), 3a 19 (19–21), 4a 22 (21–23), 1b 33 (31–33), 1c 22 (21–24), 2b 24 (23–25), 2c 22 (21–23), 3b 23 (22–24), 4b 27 (26–28); aggenital setae, ag 28 (27–28), ag-ag 32 (29–32); genital setae two pairs,  $g_1$  31 (30–33),  $g_2$  20 (19–21),  $g_1-g_1$  32 (31–33),  $g_2-g_2$  35 (34–36),  $g_1-g_2$  10 (10–12); anal setae three pairs,  $ps_1$  11 (10–12),  $ps_2$



**Figures 9, 10.** *Parapthonobia (Anaphthonobia) haloxylonis* sp. n. adult female. **9** dorsum **10** venter.



**Figures 11–15.** *Paraplonobia (Anaplonobia) haloxylonia* sp. n. adult female. 11, 12 spermatheca 13, 14 stylophore and peritremes 15 palp.

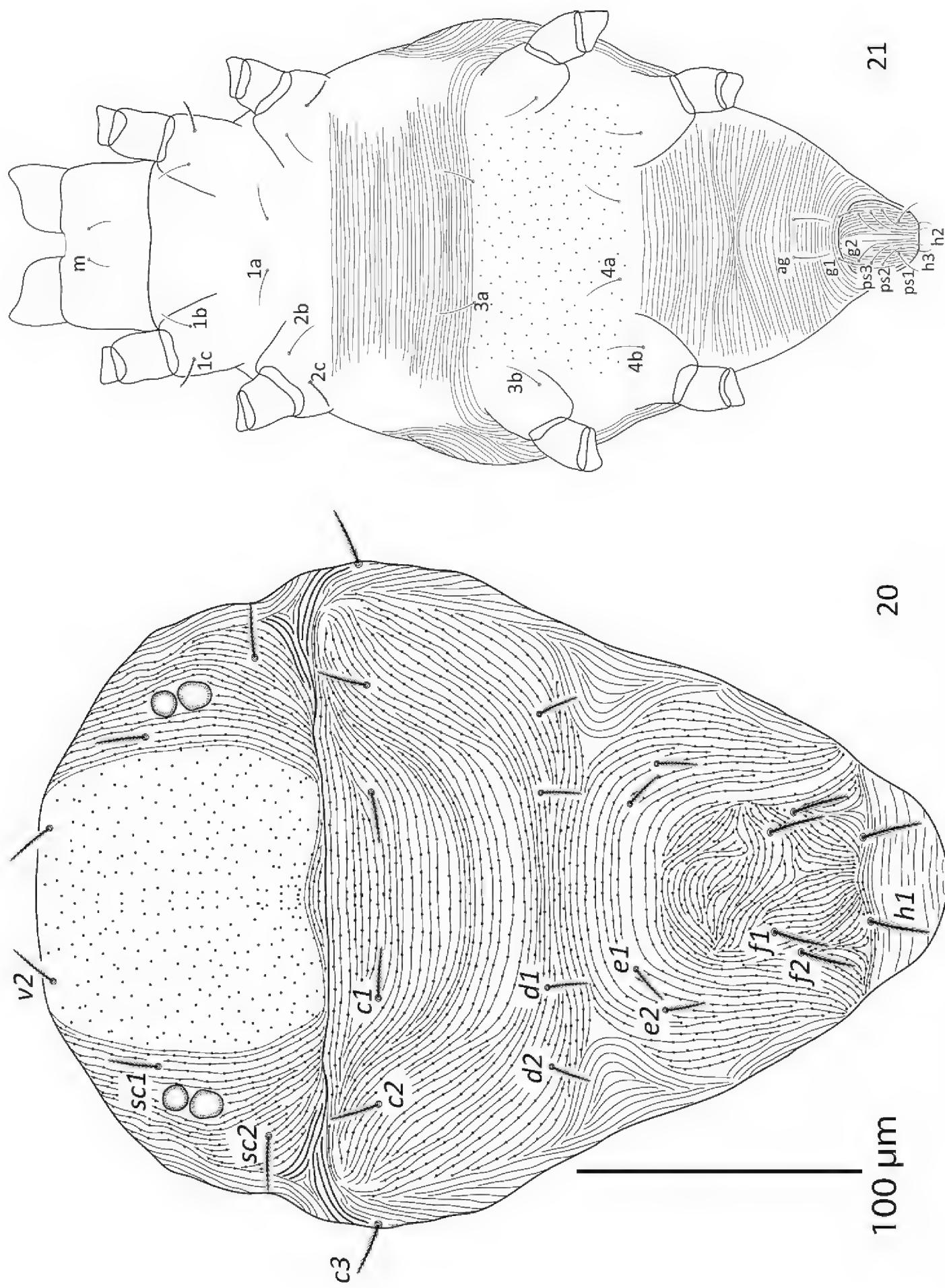


**Figures 16–19.** *Paraplonobia (Anaplonobia) haloxylonia* sp. n. **16** leg I **16A** duplex setae, empodium and claws of tarsus I **17** leg II **18** leg III **19** leg IV.

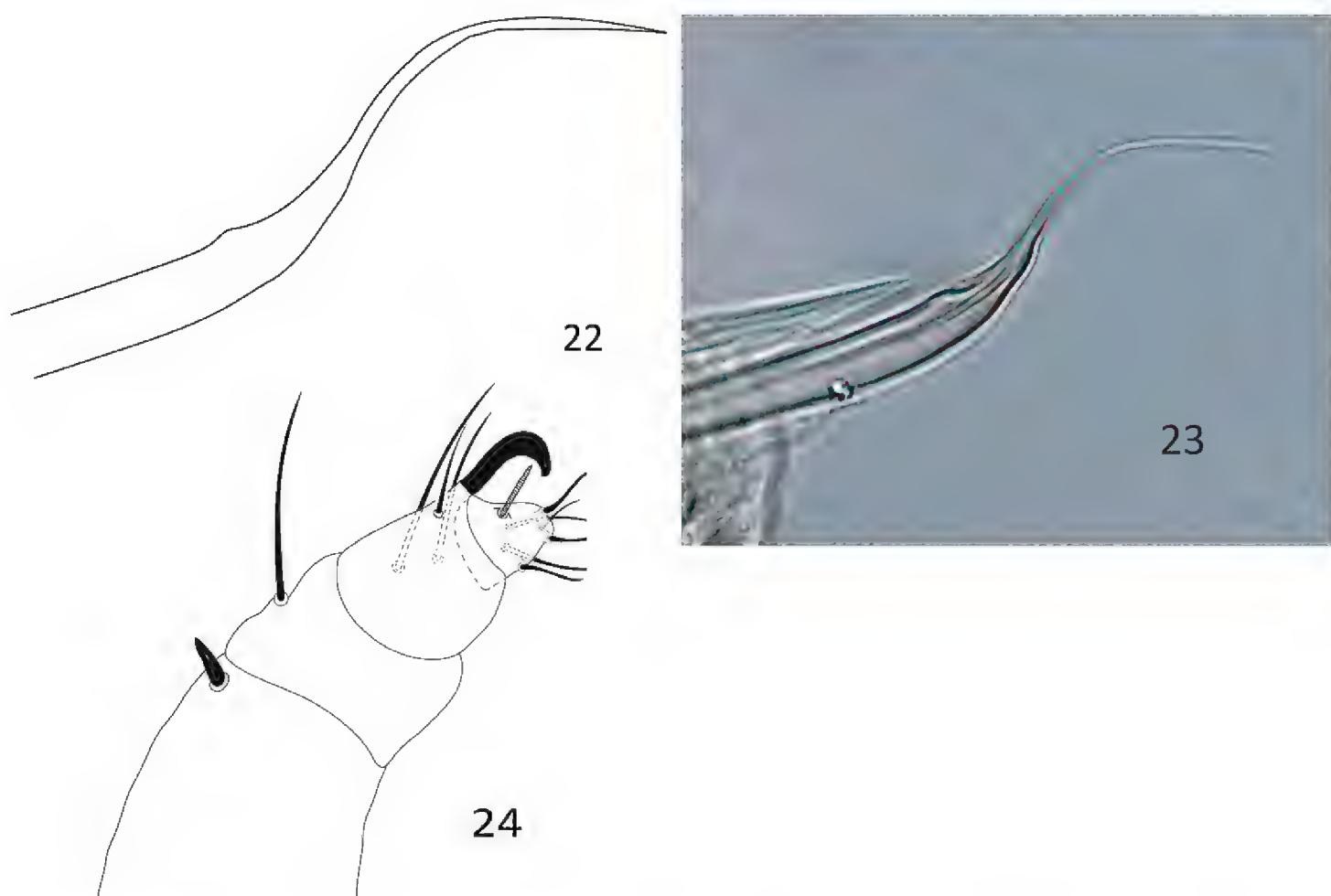
16 (15–17), ps<sub>3</sub> 17(16–18), ps<sub>1</sub>–ps<sub>1</sub> 16 (15–18), ps<sub>2</sub>–ps<sub>2</sub> 22 (20–23), ps<sub>3</sub>–ps<sub>3</sub> 26 (25–26); para-anal setae two pairs, h<sub>2</sub> 16 (15–17), h<sub>2</sub>–h<sub>2</sub> 14 (13–16), h<sub>3</sub> 17 (15–17), h<sub>3</sub>–h<sub>3</sub> 31 (30–32) (Fig. 10). Spermathecae elongate, star shaped structure at distal end (Fig. 11–12).

**Gnathosoma** (Figs 13–15). Stylophore slightly notched anteriorly. Peritremes anastomosed distally, with few long thread like branches (Figs 13–14). Scapular setae m 22 (21–23), m–m 17 (16–18). Palp femur and genu each with one seta, palp tibia with three setae, tibial claw strongly curved; palp tarsus with three setae, three eupathidia, one solenidion (Fig. 15).

**Legs** (Figs 16–19). Length of legs I–IV (without coxae) 507, 328, 340, 400 respectively. Leg I shorter than body length. Number of setae and solenidia (in parenthesis)



**Figures 20,21.** *Paraplonobia (Anaplonobia) haloxylonia* sp. n. adult male. **20** dorsum **21** venter.



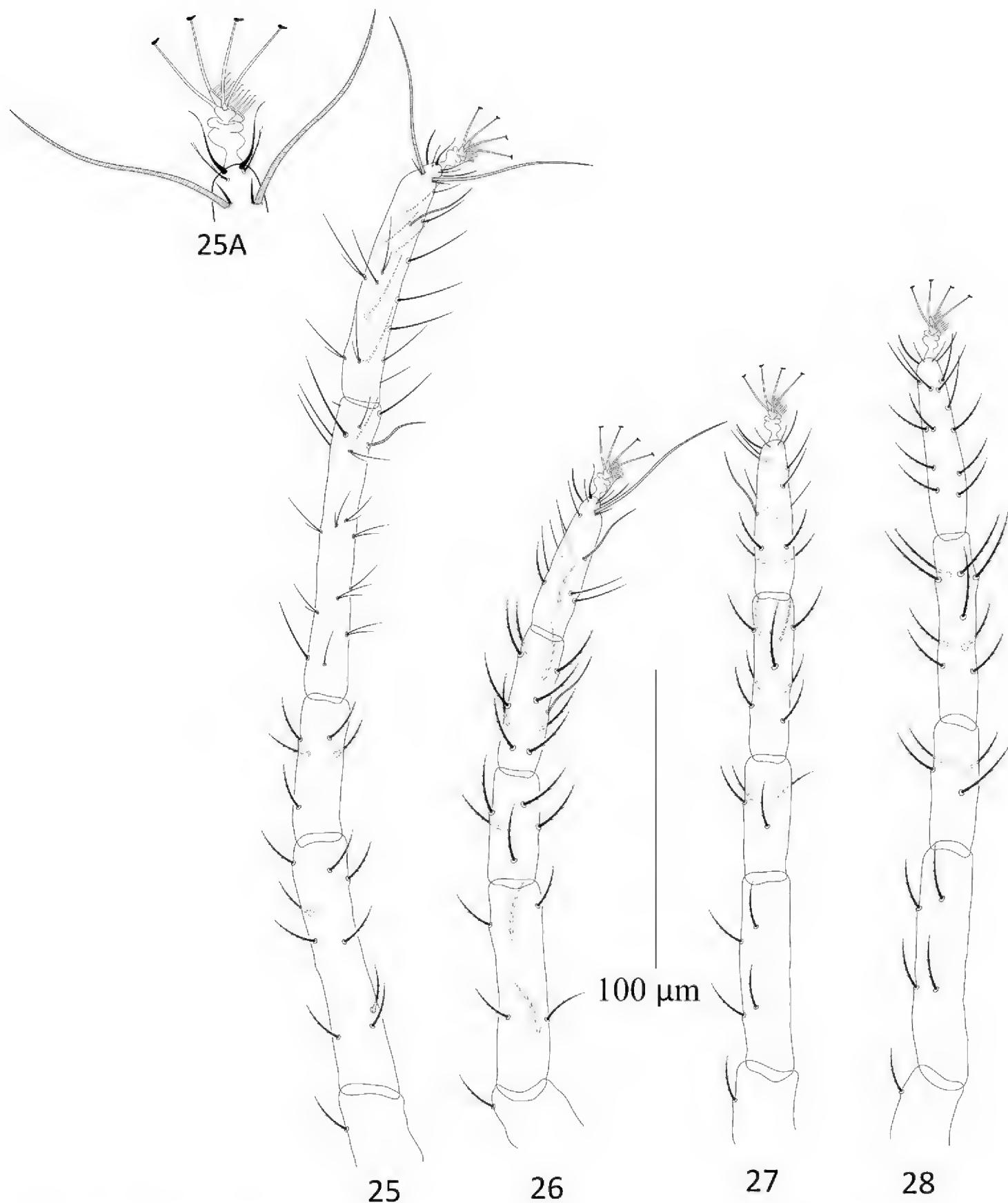
**Figures 22–24.** *Paraplonobia (Anaplonobia) haloxylonia* sp. n. adult male. **22–23** aedeagus **24** palp.

on legs I–IV: coxae 2–2–1–1, trochanters 1–1–1–1, femora 9–6–4–4, genua 5–5–4–4, tibiae 13(1)–9–9–9; tarsi I with 15 tactile setae, two sets of duplex setae at distal end, 11 tactile setae and two solenidia well proximal to duplex setae, two eupathidia; tarsi II with 10 tactile setae, one set of duplex setae, two eupathidia and one solenidion; tarsi III with 12 tactile setae and one solenidion; tarsi IV with 12 tactile setae and one solenidion. True claws pad like each with one pair of tenant hair; empodium pad-like with two rows of small tenant hairs.

**Male (n = 11)** (Figs 20–28). **Dorsum** (Fig. 20). Body almost oval, slightly tapering caudally; idiosoma 320–325 long, 190 wide; striations on dorsum entirely dotted; propodosomal striations same as in female, hysterosomal also same as in female except longitudinal/oblique or irregular in the area medially between dorsal setae e1 and h1, shape of setae also same as in female.

**Venter** (Figs 21–23). Idiosoma ventrally with transverse striations except in the area between ventral setae 3a and 4a and genito-anal area; the area between 3a and 4a with simple dots (without striations); genito-anal setae five pair, genital setae two pairs ( $g_1, g_2$ ), anal setae three pairs ( $ps_1, ps_2, ps_3$ ); para-anal setae two pairs ( $h_2, h_3$ ); aedeagus up turned, broadly sigmoid, sharply tapering distally (Figs 22–23).

**Gnathosoma.** Stylophore and peritremes as in female; palp femur with small horn-like seta, palp genu with one dorsal seta, palp tibia with three setae and strongly curved tibial claw; palp tarsus thumb like with one solenidion, three eupathidia and three setae (Fig. 24).



**Figures 25–28.** *Paraplonobia (Anaplonobia) haloxylonia* sp. n. adult male. **25** leg I **25A** duplex setae, empodium and claws of tarsus I **26** leg II **27** leg III **28** leg IV.

**Legs** (Figs 25–28). Length of leg I–IV (without coxae) 366, 223, 250, 289 respectively. Setae with solenidion in parenthesis on legs I–IV as; coxae 2–2–1–1, trochanters 1–1–1–1, femora 9–6–4–4, genua 5–5–4–4, tibiae 9(2)+8duplex–10(1)–9–9, tarsus I with six pairs of duplex setae (two pairs distally, two pairs at mid and two pairs at proximal part of the tarsus), 15 tactile setae, two eupathidia, one solenidion, tarsus II with one duplex seta, nine tactile setae, two eupathidia, one solenidion, tarsus III with

12 tactile setae, one solenidion, tarsus IV with 13 tactile setae, one solenidion. True claws pad like each with one pair of tenant hair; empodium pad-like with two rows of small tenant hairs.

**Etymology.** The specific epithet is derived after the host plant, *Haloxylon salicornicum* from which some type specimens were collected.

**Type material.** Holotype female, one male and two female paratypes, *H. salicornicum* (Amaranthaceae), Salbookh Road, Dariyah, Riyadh, SA, 24°30.649'N, 46°46.615'E, September, 18, 2012, coll. M. Kamran; four males and 22 female paratypes, *Hilaria* sp. (Poaceae), Tashlia, Heyer Road, Riyadh, SA, 24°29.000'N, 46°47.890'E, January, 17, 2015, coll. J.H. Mirza; five males and four females paratypes, *Hilaria* spp. (Poaceae), Sanabal Farm, Kharaj, Riyadh, SA, 24°16.999'N, 47°11.854'E, January, 23, 2015, coll. M. Kamran.

**Remarks.** The *P. (A.) haloxylonia* sp. n. closely resembles *P. (A.) contiguus* (Chaudhri, Akbar and Rasool 1974) because both species sharing the following set of similar characters; peritremes distally with few branches, dorsal body setae short, subequal in length, lanceolate, prodorsal shield entirely with longitudinal striations and hysterosomal striations closely spaced. The new species, differs from *P. (A.) contiguus* by comparative length of leg I (shorter than body vs. longer than body), dorsocentral setae (c1, d1 and e1) almost 1/3 to the distance of setae next behind vs. more than half, number of setae on genu I (5 vs. 4) in *P. (A.) contiguus*.

### *Paraplonobia (Anaplonobia) tabukensis* sp. n.

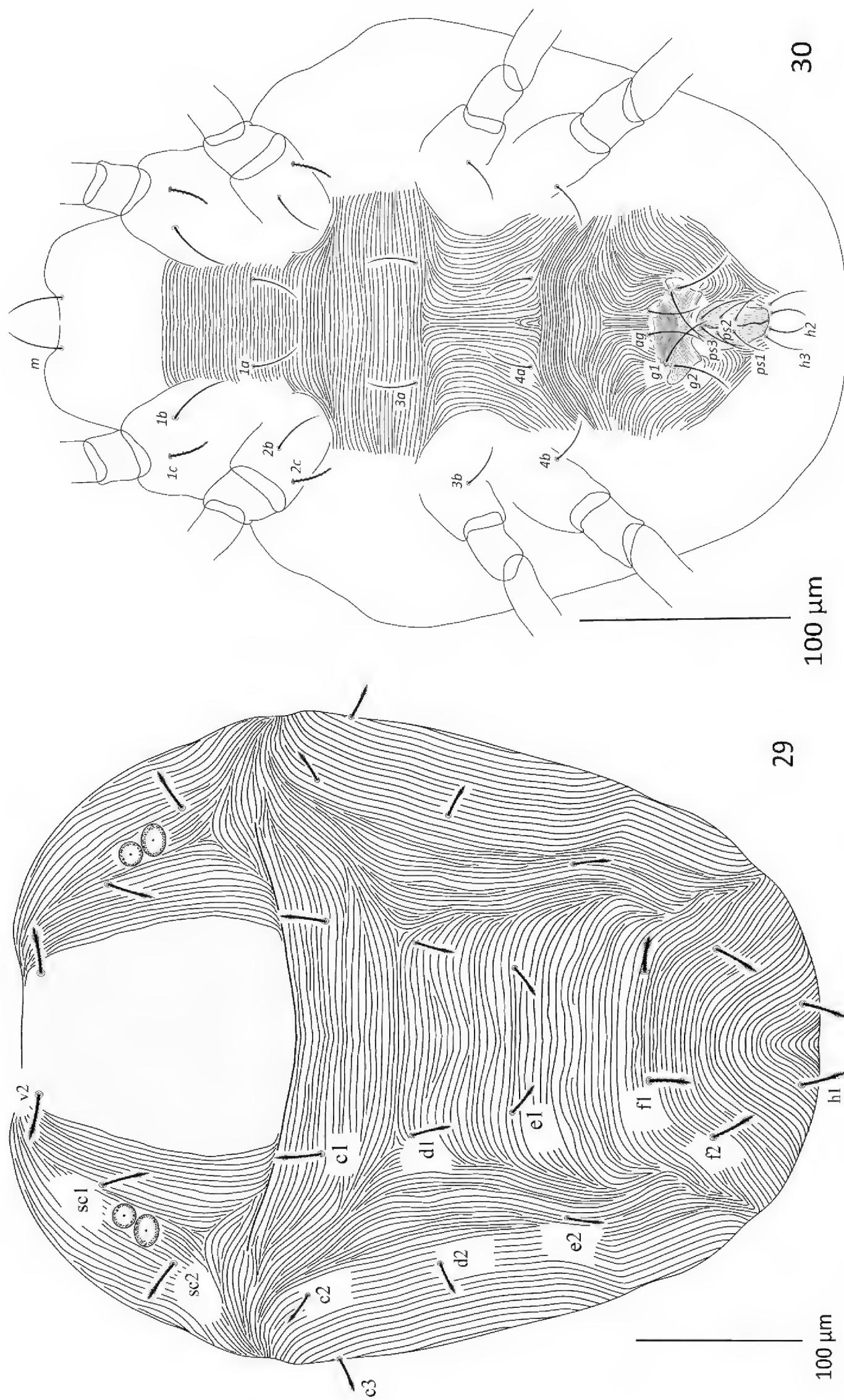
<http://zoobank.org/57BF2D3A-80B0-4C7E-90CD-FACB4543B5FF>

Figs 29–36

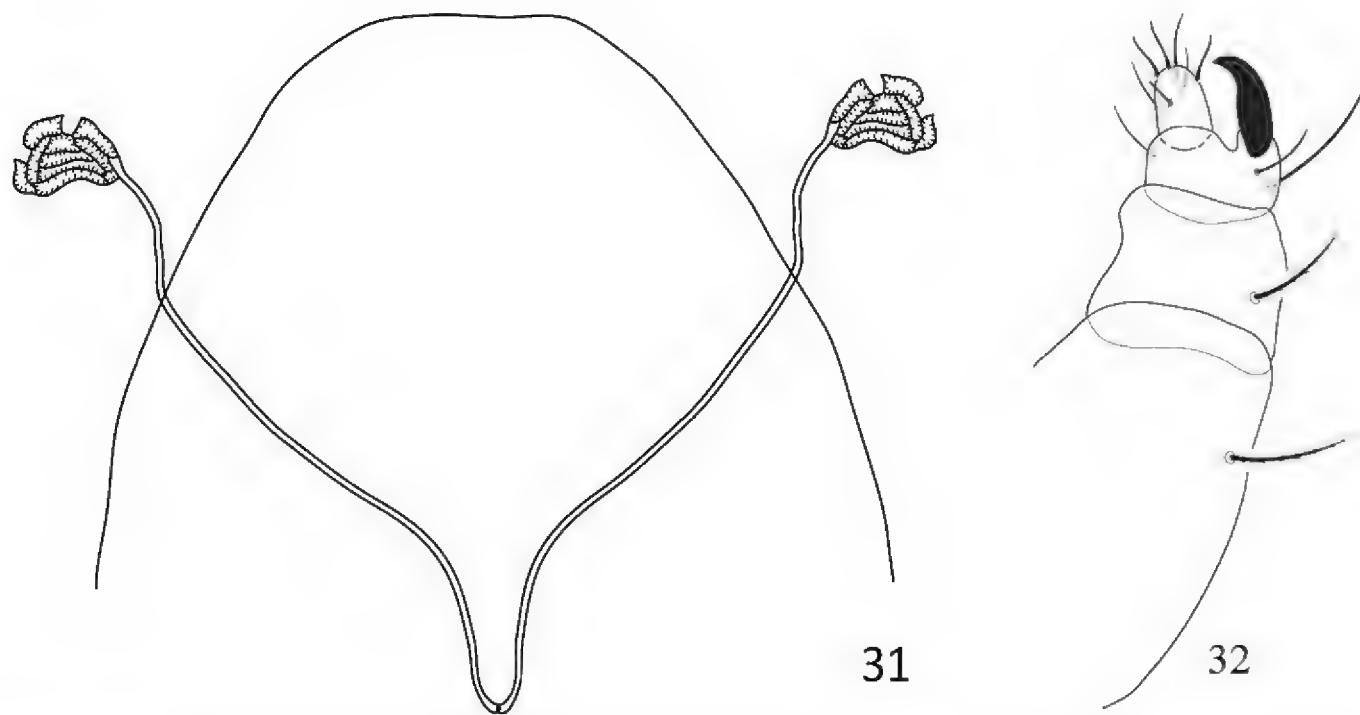
**Diagnosis.** Dorsal setae slightly lanceolate, densely serrate, not present on tubercles and distinctly shorter to the distances of setae next behind, prodorsum entirely with longitudinal striations, hysterosomal striations closely spaced, peritremes complex anastomosed distally, stylophore slightly rounded anteriorly, leg I shorter than body length, number of setae on femur I–IV 8–6–3–3, number of setae on genu I–IV 4–5–3–3.

**Description of holotype female** (n = 3). Measurements of holotype followed by 2 paratypes (in parenthesis) (Figs 29–36).

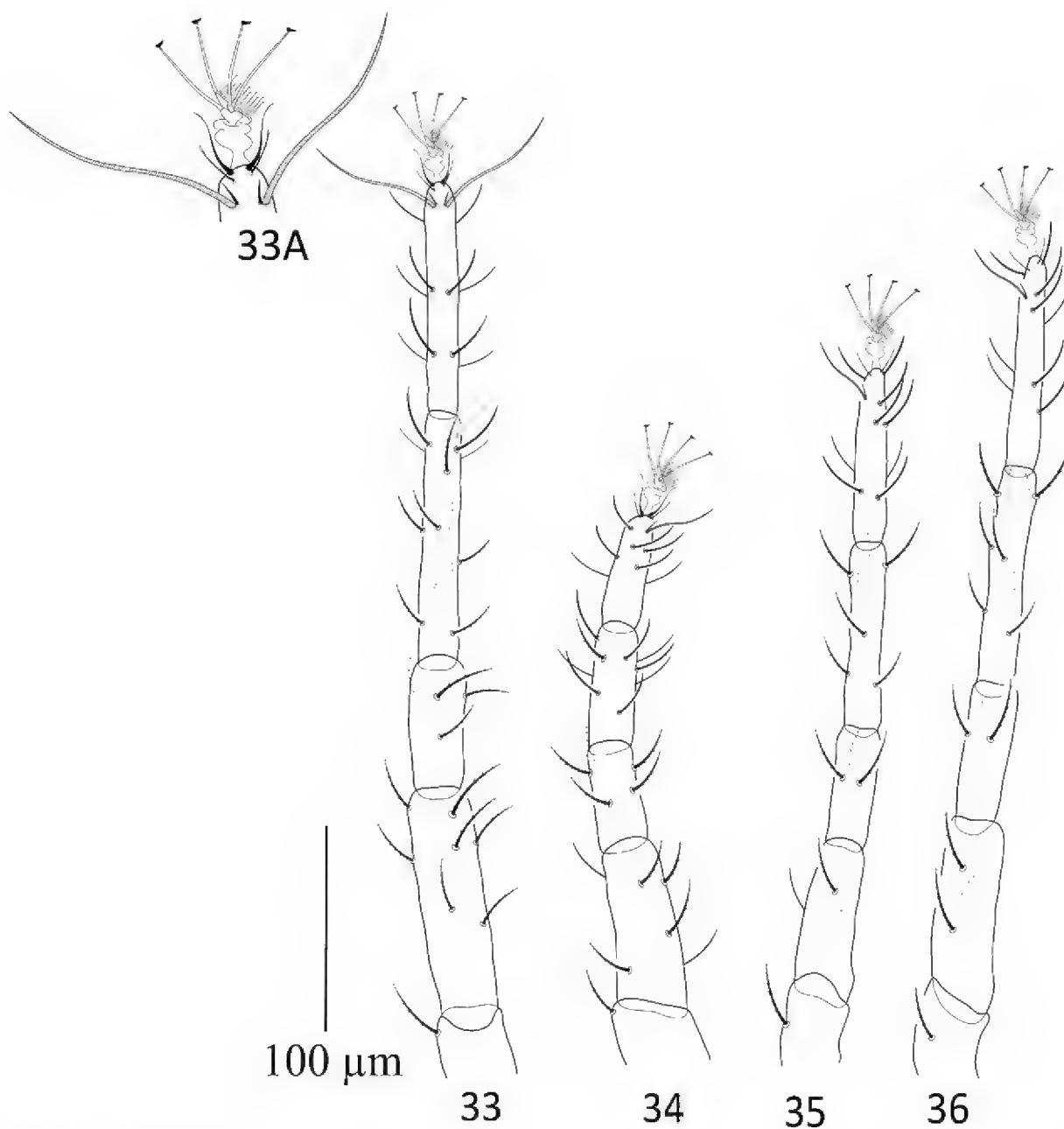
**Dorsum** (Fig. 29). Body rounded; length of idiosoma 483 (480–490), maximum width 445 (440–450), length of body (gnathosoma + idiosoma) 595 (590–610). Prodorsoma medially with weak and laterally with strong longitudinal regular striations; hysterosomal striations medially transverse and closely spaced, laterally longitudinal irregular. Dorsal setae slightly lanceolate, densely serrate, not present on tubercles and distinctly shorter to the distances of setae next behind, dorsocentral setae (c1, d1 and e1) almost 1/3 to the distance of setae next behind. Length of dorsal setae: v<sub>2</sub> 34 (32–36), sc<sub>1</sub> 29 (28–31), sc<sub>2</sub> 30 (28–32), c<sub>1</sub> 28 (26–30), c<sub>2</sub> 26 (24–28), c<sub>3</sub> 29 (28–32), d<sub>1</sub> 23 (21–25), d<sub>2</sub> 22 (21–24), e<sub>1</sub> 21 (20–23), e<sub>2</sub> 22 (21–24), f<sub>1</sub> 23 (21–24), f<sub>2</sub> 26 (24–27), h<sub>1</sub> 27 (25–29). Distance between dorsal setae: v<sub>2</sub>–v<sub>2</sub> 89 (85–90), v<sub>2</sub>–sc<sub>1</sub> 68



Figures 29, 30. *Paraplonobia (Anaplonobia) tabukensis* sp. n. adult female 29 dorsum 30 venter.



**Figures 31, 32.** *Paraplonobia (Anaplonobia) tabukensis* sp. n. adult female. **31** Stylophore and peritremes **32** palp.



**Figures 33–36.** *Paraplonobia (Anaplonobia) tabukensis* sp. n. **33** leg I **33A** duplex setae, empodium and claws of tarsus I **34** leg II **35** leg III **36** leg IV.

(65–690),  $sc_1-sc_2$  68 (67–70),  $sc_1-sc_1$  204 (202–206),  $sc_2-sc_2$  301 298–302),  $c_1-c_1$  138 (135–140),  $c_1-c_2$  91 (89–92),  $c_2-c_3$  79 (75–80),  $c_2-c_2$  327 (325–328),  $c_3-c_3$  424 (422–426),  $d_1-d_1$  119 (118–120),  $d_1-d_2$  91 (89–92),  $d_2-d_2$  295 (292–298),  $c_1-d_1$  88 (86–89),  $c_3-d_2$  110 (109–112),  $e_1-e_1$  27 (25–28),  $e_1-e_2$  85 (84–86),  $e_2-d_2$  85 (84–86),  $e_2-e_2$  229 (228–231),  $f_1-f_1$  78 (76–80),  $f_2-f_2$  113 (110–114),  $f_1-f_2$  35 (33–36),  $f_1-d_1$  82 (81–84),  $h_1-h_1$  53 (52–56).

**Venter** (Fig. 30). Idiosoma ventrally with transverse simple striations from setae 1a to 3a; longitudinal regular between setae 3a and 4a; transverse posterior to setae 4a; striations longitudinal regular anterior to aggenital setae (ag). Length of intercoxal and coxal setae: 1a 40 (38–42), 3a 32 (31–34), 4a 32 (30–35), 1b 46 (44–47), 1c 32 (31–34), 2b 30 (29–34), 2c 29 (28–31), 3b 32 (31–34), 4b 32 (31–35); aggenital setae (ag) 42 (41–45), ag–ag 23 (21–25); genital setae two pairs,  $g_1$  43 (40–44),  $g_2$  39 (35–40),  $g_1-g_1$  52 (50–55),  $g_2-g_2$  60 (58–64),  $g_1-g_2$  12 (10–13); anal setae three pairs,  $ps_1$  20 (18–21),  $ps_2$  26 (24–27),  $ps_3$  28 (27–29),  $ps_1-ps_1$  23 (20–24),  $ps_2-ps_2$  32 (31–35),  $ps_3-ps_3$  23 (21–26); para-anal setae two pairs,  $h_2$  27 (26–28),  $h_2-h_2$  11 (10–13),  $h_3$  32 (31–34),  $h_3-h_3$  28 (27–29).

**Gnathosoma** (Figs 31–32). Stylophore rounded anteriorly. Peritremes small compact anastomosed distally (Fig. 31). Scapular setae m 28 (27–29), m–m 37 (26–39). Palp femur and genu each with one seta, palp tibia with three setae, tibial claw strongly curved; palp tarsus with three setae, three eupathidia, one solenidion (Fig. 32).

**Legs** (Figs 33–36). Length of legs I–IV (without coxae) 450, 282, 345, 408 respectively. Leg I shorter than body length. Number of setae and solenidia (in parenthesis) on legs I–IV: coxae 2–2–1–1, trochanters 1–1–1–1, femora 8–6–3–3, genua 4–5–3–3, tibiae 13(1)–9–8–8; tarsi I with 10 tactile setae, two sets of duplex setae at distal end, all tactile setae well proximal to duplex setae, two eupathidia; tarsi II with 7 tactile setae, one set of duplex setae, two eupathidia; tarsi III with 11 tactile setae, one set of duplex setae;; tarsi IV with 11 tactile setae one set of duplex setae,. True claws pad like each with one pair of tenant hair; empodium pad-like with two rows of small tenant hairs.

**Male.** Not in collection.

**Etymology.** The specific epithet is derived from the region of Saudi Arabia, Tabuk, from where it was collected.

**Type material.** Holotype female, two paratype females, *H. salicornicum* (Amaranthaceae), 30 km Tabuk road, Sharma, Tabuk region, SA, 28°03.479'N, 035°17.186'E, October, 19, 2015, coll. M. Kamran and J.H. Mirza.

**Remarks.** The *P. (A.) tabukensis* sp. n. closely resembles *P. (A.) theroni* (Meyer 1974) because both species share the following set of similar characters; dorsal body setae, lanceolate and distinctly shorter to the distances of setae next behind, prodorsum entirely with longitudinal striae, hysterosomal striations closely spaced, peritremes complex anastomosed distally (Meyer 1974, 1987). The new species differs from *P. (A.) theroni* by shape of stylophore anteriorly (rounded vs. slightly indented), number of setae on femur I–IV (8–6–3–3 vs. 9–6–4–4), number of setae on genu I–IV (4–5–3–3 vs. 5–5–6–6), number of setae on tibia III (8 vs. 6) and on tarsi I–II excluding duplex setae and solenidia (10–7 vs. 18–14) in *P. (A.) theroni*.

**Key to the world species of the genus *Paraplonobia* (Prostigmata: Tetranychidae) (after Meyer 1987).**

- 1 Coxal formula not exceeding 3–3–1–1 ..... **2**
- Coxal formula 4–3–2–2, dorsal body setae serrate pointed at the tip not set on tubercles, peritremes simple, empodial pad and true claws equal in length .....  
..... **subg. *Brachynychus*, species *P. (B.) cousiniae* (Mitrofanov & Strunk.)**
- 2 Peritremes anastomosed ..... **subg. *Anaplonobia*, 11**
- Peritremes simple ..... **subg. *Paraplonobia*, 3**
- 3 Stylophore rounded anteriorly ..... **4**
- Stylophore notched anteriorly ..... **5**
- 4 Dorsal body setae slightly lanceolate, leg I shorter than body .....  
..... ***P. (P.) edenvillensis* Meyer**
- Dorsal body setae slender, leg I about as long as body .....  
..... ***P. (P.) myops* (Pritchard & Baker)**
- 5 Dorsal body setae generally slender or slightly lanceolate and pointed distally ..... **6**
- Dorsal body setae broadly lanceolate ..... **9**
- 6 First three pair of dorsocentral setae  $c_1$ ,  $d_1$  and  $e_1$  about half as long as distance between bases of consecutive setae ..... **7**
- First three pair of dorsocentral setae  $c_1$ ,  $d_1$  and  $e_1$  minute about a third to a fourth as long as the distance between bases of consecutive setae ..... **8**
- 7 Length of body 466  $\mu\text{m}$  (530  $\mu\text{m}$  including gnathosoma), leg I as long as body, posterior opisthosomal setae longer than longitudinal distance between their bases ..... ***P. (P.) hilariae* Tuttle & Baker**
- Length of body 380  $\mu\text{m}$ , leg I 160  $\mu\text{m}$  long, shorter than body, posterior opisthosomal setae shorter than longitudinal distance between their bases ....  
..... ***P. (P.) herniariae* (Bagdasarian)**
- 8 Body elongate, length of body 345  $\mu\text{m}$ , length of leg I 191  $\mu\text{m}$  (without coxa and trochanter) ..... ***P. (P.) boutelouae* Baker & Tuttle**
- Body oval, length of body 570  $\mu\text{m}$ , length of leg I 419  $\mu\text{m}$  (without coxa and trochanter) ..... ***P. (P.) dactylni* Smiley & Baker**
- 9 Dorsocentral setae ( $c_1$ ,  $d_1$ ,  $e_1$  and  $f_1$ ) more than half as long as distances between consecutive setae, leg I shorter than body ..... **10**
- Dorsocentral setae ( $c_1$ ,  $d_1$ ,  $e_1$  and  $f_1$ ) almost half as long as distances between consecutive setae, leg I shorter than body ..... ***P. (P.) tridens* Tuttle & Baker**
- 10 Peritremes terminating in a ball-like rounded structure; prodorsum with a wellmarked punctate shield; tibia IV with 8 setae .....  
..... ***P. (P.) penicillatus* Chaudhri et al.**
- Peritremes terminating in oval shaped structure; prodorsum without a well-marked punctate shield; tibia IV with 7 setae .....  
..... ***P. (P.) echinopsili* (Wainstein)**

- 11 Dorsal body setae slightly shorter/as long as/ longer than distances between their bases ..... 28
- Dorsal setae distinctly shorter than distances between their bases ..... 12
- 12 Dorsal integument striated, without tubercles or lumps ..... 13
- Dorsal integument provided with tubercles or lumps forming a distinct pattern along with striation ..... *P. (A.) glebulenta* (Meyer)
- 13 Dorsal body setae slender, setiform ..... 14
- Dorsal body setae broadly spatulate, subspatulate or lanceolate ..... 15
- 14 Stylophore indented anteriorly, dorsocentral setae c<sub>1</sub>, d<sub>1</sub> and e<sub>1</sub> about 2/3 of the distance between their basis, peritremes weakly anastomosed .....  
..... *P. (A.) inornata* (Meyer)
- Stylophore rounded anteriorly, dorsocentral setae c<sub>1</sub>, d<sub>1</sub> and e<sub>1</sub> about half the distance between, peritremes strongly anastomosed, stylophore rounded anteriorly ..... *P. (A.) ambrosiae* (Tuttle et al.)
- 15 All dorsal body setae spatulate, subspatulate, expanded distally ..... 16
- Most of dorsal body setae lanceolate, not expanded distally ..... 19
- 16 First pair of dorsocentral setae c<sub>1</sub> less than half as long as distances to the bases setae next behind ..... 17
- First pair of dorsocentral setae c<sub>1</sub> at least reaching 1/2 or 2/3 of distance to the bases of setae next behind ..... 18
- 17 Prodorsum medially with irregular broken striations .....  
..... *P. (A.) boutelouae* Tuttle & Baker
- Prodorsum medially with regular longitudinal striations .....  
..... *P. (A.) algarrobicola* (Gonzalez)
- 18 First pair of dorsocentral setae c<sub>1</sub> reaching one half to the distance of setae next behind, setae c<sub>1</sub> and f<sub>1</sub> almost sub/equally spaced .....  
..... *P. (A.) prosopis* (Tuttle & Baker)
- First pair of dorsocentral setae c<sub>1</sub> reaching 2/3 to the distance of setae next behind, setae c<sub>1</sub> almost 1.5 times widely spaced than setae f<sub>1</sub> .....  
..... *P. (A.) arabica* sp. n.
- 19 Hysterosomal setae d<sub>1</sub> and e<sub>1</sub> lanceolate and about half as long as f<sub>1</sub>, setae f<sub>1</sub> spatulate ..... *P. (A.) brickellia* Baker & Tuttle
- Dorsocentral setae subequal in length, lanceolate serrate ..... 20
- 20 Prodorsum entirely with longitudinal striations ..... 21
- Median area of prodorsum entirely/partially with transverse striations ..... 26
- 21 Peritremes ending with few irregular branches ..... 22
- Peritremes distally with complex anastomosed ..... 24
- 22 Stylophore slightly indented anteriorly, dorsum with closely spaced striations ..... 23
- Stylophore rounded anteriorly, dorsum with widely spaced striations .....  
..... *P. (A.) acharis* (Pritchard & Baker)

- 23 Leg I distinctly longer than the body, first pair of dorsocentral setae c1 more than half to the distance of setae next behind.....  
 ..... *P. (A.) contiguus* (Chaudhri et al.)
- Leg I shorter than body, first pair dorsocentral setae c1 1/3 to the distance of setae next behind ..... *P. (A.) haloxylonia* sp. n.
- 24 Dorsum with widely spaced striations, femora I with 11 setae .....  
 ..... *P. (A.) candicans* (Meyer)
- Dorsum with closely spaced striations, femora I with 8 or 9 setae ..... 25
- 25 Stylophore rounded anteriorly, setae on femora I–IV 8–6–3–3, setae of genua I–IV 4–5–3–3 ..... *P. (A.) tabukensis* sp. n.
- Stylophore indented anteriorly, setae on femora I–IV 9–6–4–4, setae of genua I–IV 5–5–6–6 ..... *P. (A.) theroni* (Meyer)
- 26 Propodosomal shield medially with two distinct bands of transverse stria-  
 tions ..... *P. (A.) daryaensis* Chaudhri et al.
- Propodosomal shield entirely with transverse strations ..... 27
- 27 Leg I shorter than body, peritremes weakly anastomosed .....  
 ..... *P. (A.) harteni* (Meyer)
- Leg I longer than body, peritremes with complex anastomose.....  
 ..... *P. (A.) concolor* Chaudhri et al.
- 28 Stylophore anteriorly rounded ..... 29
- Stylophore anteriorly deeply notched ..... *P. (A.) tshipensis* (Meyer)
- 29 Dorsal body setae slender/setiform ..... 31
- Dorsal body setae spatulate/subspatulate ..... 30
- 30 Dorsal body setae set on tubercles, longer than the distances of setae next  
 behind, propodosoma with broken stria-  
 tions .....  
 ..... *P. (A.) juliflorae* (Tuttle & Baker)
- Dorsal body setae not set on tubercles, as long as or slightly shorter to the  
 distances of setae next behind, propodosoma medially with basket weaved  
 pattern ..... *P. (A.) euphorbiae* (Tuttle & Baker)
- 31 Opisthosomal setae much longer than the distance to the setae next in line ..  
 ..... *P. (A.) coldeniae* (Tuttle & Baker)
- Opisthosomal setae as long as the distance to the setae next in line ..... 32
- 32 Prodorsal shield pebbled, most of opisthosomal setae set on tubercles.....  
 ..... *P. (A.) calame* (Pritchard & Baker)
- Prodorsal shield tuberculate/striate, opisthosomal setae not set on tubercles..... 33
- 33 Opisthosomal stria-  
 tions closely spaced with fine lobes .....  
 ..... *P. (A.) artemisia* Baker & Tuttle
- Prodorsal shield tuberculate ..... 34
- 34 Opisthosomal stria-  
 tions mostly broad folds and covered with tubercles, peri-  
 tremes small bulb like anastomosing ..... *P. (A.) berberis* Baker & Tuttle
- Opisthomosal stria-  
 tions comparatively closely spaced with fine lobes, peri-  
 tremes elongate anastomose ..... *P. (A.) allionia* Baker & Tuttle

## Genus *Neopetrobia* Wainstein, 1956

*Monoceronychus*: Pritchard and Baker 1955: 77.

*Neopetrobia*: Wainstein 1956: 151, Wainstein 1960a: 128, Tuttle and Baker 1968: 57, Meyer 1974: 93–94.

**Type species.** *Neopetrobia dubinini* Wainstein, 1956.

**Diagnosis.** Based on Baker and Tuttle 1968, Gutierrez 1955, Meyer 1974, Meyer 1987, and Bolland et al. 1998.

True claws pad like, each bearing a pair of tenant hairs; empodial pad longer than true claws, bearing a row of tenant hairs, distally not coalescent; dorsum with 3 pairs of prodorsal setae which are short and spindle shaped or spatulate; setal tubercles small or nonexistent; fourth pair of dorsocentral setae ( $f_1$ ) widely spaced, not normal as  $c_1$ ; peritremes anastomosing distally.

### Subgenus *Neopetrobia* Wainstein

**Diagnosis.** Based on Gutierrez 1985, and Bolland et al. 1998.

Integument without tuberculate or reticulate pattern; dorsal setae rounded or spindle-shaped.

#### *Neopetrobia mcgregori* (Pritchard & Baker)

Figs 37–44

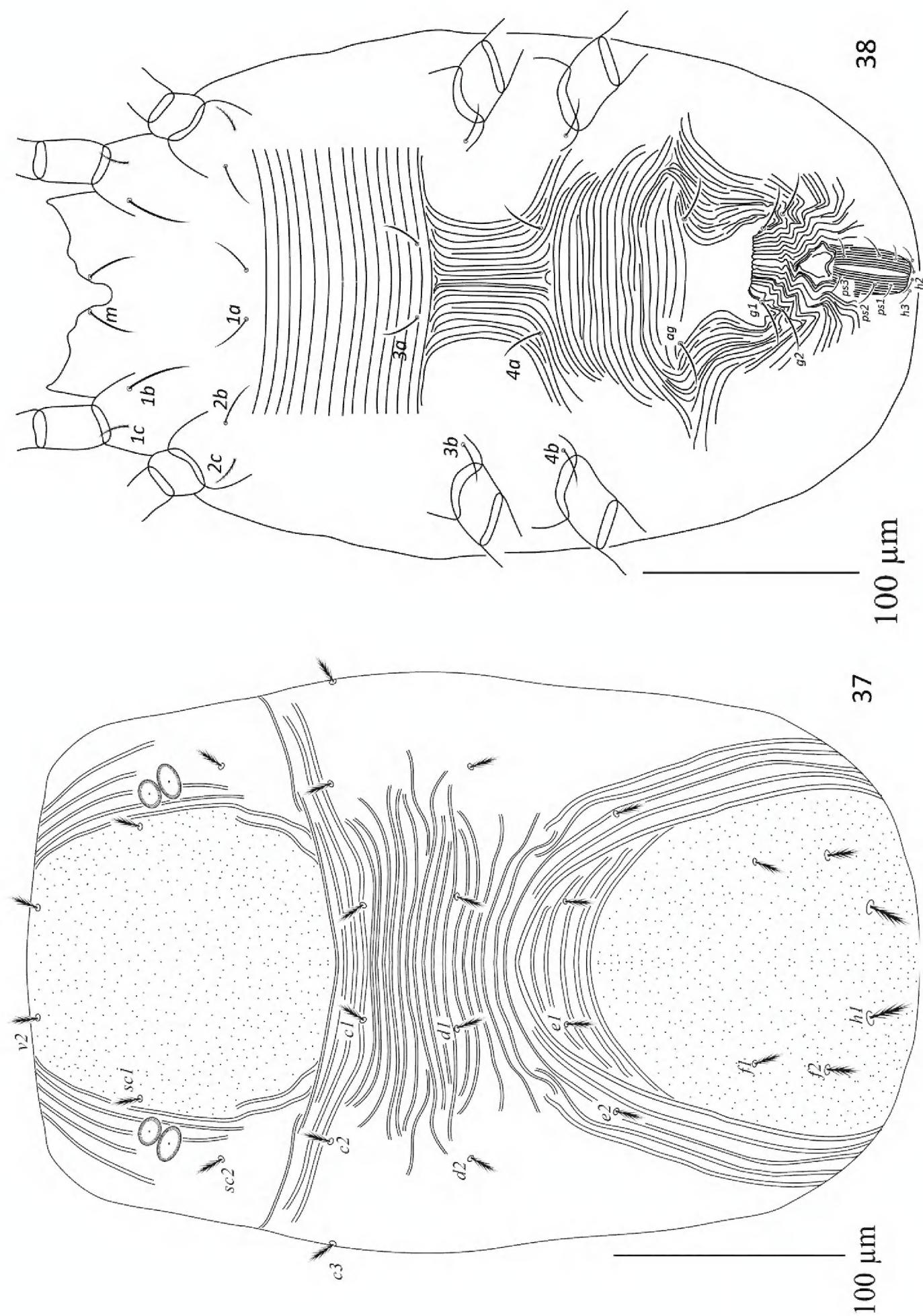
*Monoceronychus mcgregori* Pritchard & Baker, 1955.

*Neopetrobia mcgregori* (Pritchard & Baker) Meyer, 1987. Bolland et al. 1998.

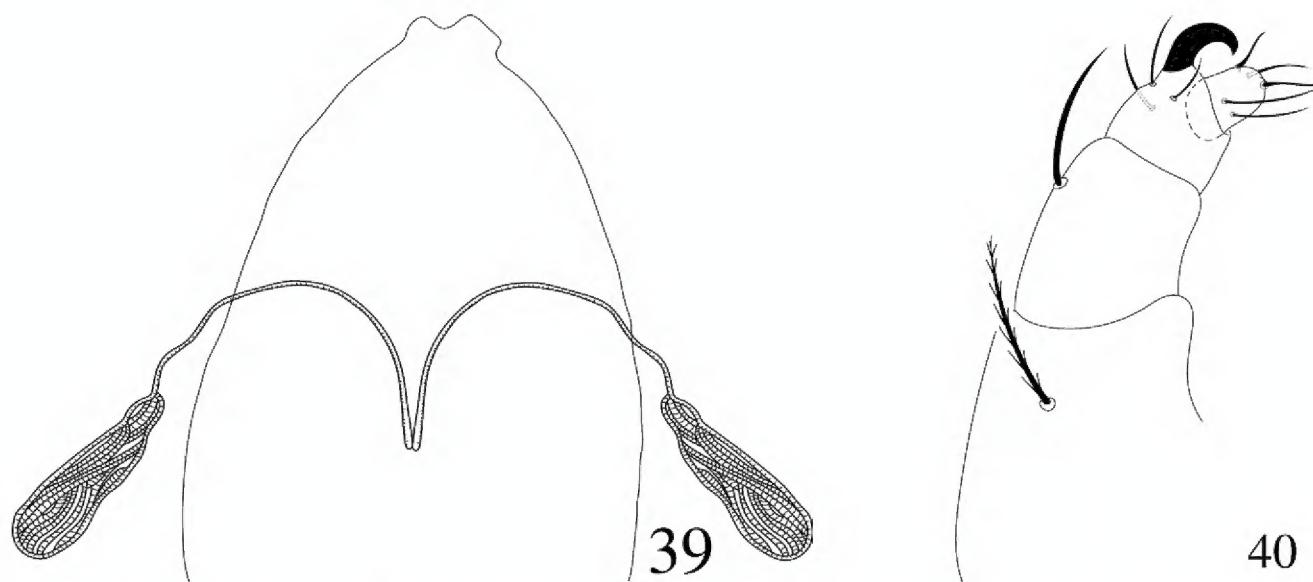
**Redescription. Female** (n=9). Body oval; length of idiosoma 369–372, maximum width 238–241, length of body (gnathosoma + idiosoma) 430–433.

**Dorsum** (Fig. 37). Propodosoma without anterior projections. Dorsum of opisthosoma and most of opisthosoma with nearly smooth integument, metapodosomal dorsum with widely spaced strong striations. Dorsal body setae minute, lanceolate, densely serrate, not present on tubercles. Length of dorsal setae:  $v_2$  13–14,  $sc_1$  14–15,  $sc_2$  13–14,  $c_1$  13–14,  $c_2$  12–13,  $c_3$  10–11,  $d_1$  11–12,  $d_2$  12–13,  $e_1$  10–11,  $e_2$  12–13,  $f_1$  11–12,  $f_2$  15–16,  $h_1$  16–17. Distance between dorsal setae:  $v_2$ – $v_2$  54–56,  $v_2$ – $sc_1$  48–50,  $sc_1$ – $sc_2$  47–50,  $sc_1$ – $sc_1$  113–114,  $sc_2$ – $sc_2$  165–167,  $c_1$ – $c_1$  57–58,  $c_1$ – $c_2$  50–52,  $c_2$ – $c_3$  41–42,  $c_2$ – $c_2$  161–162,  $c_3$ – $c_3$  234–236,  $d_1$ – $d_1$  57–58,  $d_1$ – $d_2$  56–57,  $d_2$ – $d_2$  160–161,  $c_1$ – $d_1$  57–58,  $c_3$ – $d_2$  79–80,  $e_1$ – $e_1$  54–56,  $e_1$ – $e_2$  45–47,  $e_2$ – $d_2$  64–66,  $e_2$ – $e_2$  135–136,  $f_1$ – $f_1$  80–82,  $f_2$ – $f_2$  86–88,  $f_1$ – $f_2$  31–32,  $f_1$ – $d_1$  79–80,  $h_1$ – $h_1$  38–40.

**Venter** (Fig. 38). Idiosoma ventrally with transverse simple widely spaced striations from setae 1a to 3a; longitudinal regular between setae 3a and 4a; transverse pos-



**Figures 37, 38.** *Neopetrobia (Neopetrobia) mcgregori* (Pritchard & Baker) adult female. **37** dorsum **38** venter.



**Figures 39, 40.** *Neopetrobia (Neopetrobia) mcgregori* (Pritchard & Baker) adult female. **39** stylophore and peritremes **40** palp.

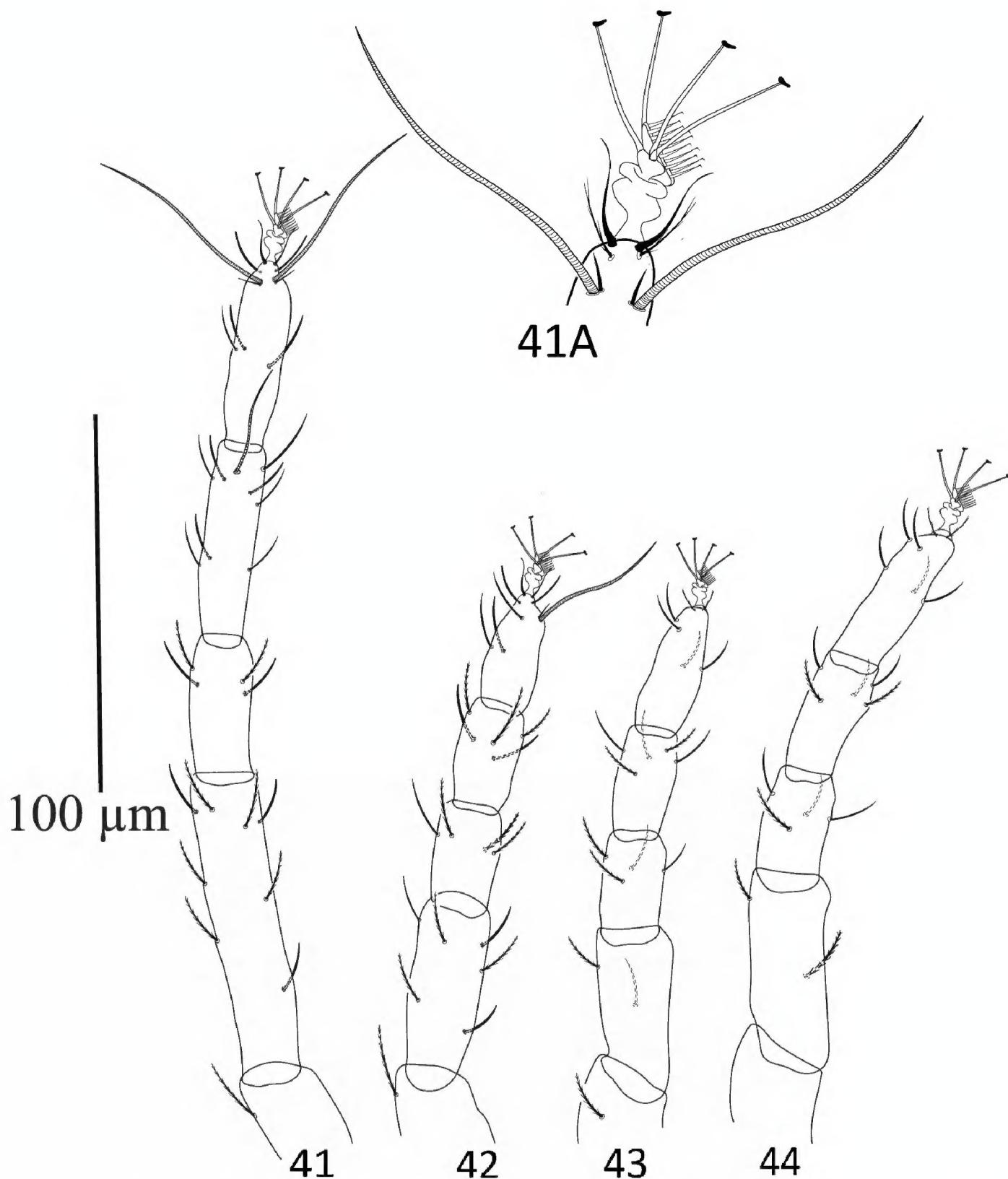
terior to setae 4a; striations transverse regular anterior to aggenital setae (ag). Length of intercoxal and coxal setae: 1a 18–19, 3a 19–20, 4a 15–16, 1b 30–31, 1c 13–14, 2b 16–17, 2c 10–13, 3b 15–17, 4b 11–12; aggenital setae (ag) 26–27, ag–ag 38–39; genital setae two pairs,  $g_1$  17–18,  $g_2$  21–22,  $g_1-g_1$  41–42,  $g_2-g_2$  76–78,  $g_1-g_2$  21–22; anal setae three pairs,  $ps_1$  11–12,  $ps_2$  10–11,  $ps_3$  12–13,  $ps_1-ps_1$  11–13,  $ps_2-ps_2$  16–18,  $ps_3-ps_3$  11–13; para-anal setae two pairs,  $h_2$  11–13,  $h_2-h_2$  7–9,  $h_3$  7–8,  $h_3-h_3$  17–19.

**Gnathosoma** (Figs 39–40). Stylophore slender, the sides angularly converging anteriorly and with a small mediocephalic emargination. Peritremes anastomosing with distal enlargement slender. Scapular setae m 17–18, m–m 19–21. Palp femur and genu each with one seta, palp tibia with three setae, tibial claw strongly curved; palp tarsus with two setae, two eupathidia, one solenidion.

**Legs** (Fig 41–44). Length of legs I–IV (without coxae) 240, 150, 148, 180 respectively. Number of setae and solenidia (in parenthesis) on legs I–IV: coxae 2–2–1–1, trochanters 1–1–1–0, femora 8–6–2–2, genua 4–4–4–4, tibia 8(1)–9–9–9; tarsi I with 11 tactile setae, two sets of duplex setae at distal end, three setae proximal to duplex setae, two eupathidia and one solenidion; tarsi II with nine tactile setae, one set of duplex setae, two setae proximal to duplex setae, one setae in line with duplex setae, two eupathidia and one solenidion; tarsi III with six tactile setae; tarsi IV with seven tactile setae. True claws pad like each with one pair of tenant hair; empodium pad-like with two rows of small tenant hairs.

**Materials examined.** 12 females, *Cynodon dactylon* (Poaceae), near exit10, King Abdullah Road, Riyadh, SA, 24°45.826'N, 46°45.470'E, September 07, 2015, coll. M. Kamran and E. M. Khan.

**Remarks.** *Neopetrobia mcgregori* was originally described very briefly under the genus *Monoceronychus* and has been only reported from Miami shores of Florida, USA (Pritchard and Baker 1955). Later, it was moved to the genus *Neopetrobia* on the basis of widely spaced fourth pair of dorsocentral setae ( $f_1$ ) (Bolland et al. 1998). Worldwide, this is the second report of this species and no obvious differences have been observed in Saudi Arabian specimens from the original description.



**Figures 41–44.** *Neopetrobia (Neopetrobia) mcgregori* (Pritchard and Baker) adult female. **41** leg I **41A** duplex setae, empodium and claws of tarsus I **42** leg II **43** leg III **44** leg IV.

## Acknowledgement

The authors wish to thank the Deanship of Scientific Research, College of Food and Agriculture Research Center, at King Saud University, Riyadh, for providing facilities and funds to complete this research work. Also, we thank Dr. Carlos H.W. Flechtmann, Department of Entomologia, Acarologia, Universidade de São Paulo, ESALQ, CNPq-Brasil and to Dr. E.A. Ueckermann, ARC-Plant Protection Research Institute, Queenswood, Pretoria, South Africa for providing useful literature.

## References

- Alatawi FJ (2011) Phytophagous and predatory mites associated with vegetable crops from Riyadh, Saudi Arabia. *Saudi Journal of Biological Sciences* 18(3): 239–246. doi: 10.1016/j.sjbs.2011.02.004
- Baker EW, Tuttle DM (1972) New species and further notes on the Tetranychoidae mostly from south-western United States (Acarina: Tetranychidae and Tenuipalpidae). *Smithsonian Contributions to Zoology* 116: 1–37. doi: 10.5479/si.00810282.116
- Bolland HR, Gutierrez J, Flechtmann CHW (1998) World Catalogue of the Spider Mite Family (Acari: Tetranychidae). Koninklijke Brill NV, Leiden, 392 pp.
- Chaudhri WM, Akbar S, Rasool A (1974) Taxonomic studies of the mites belonging to the families Tenuipalpidae, Tetranychidae, Tuckerellidae, Caligonellidae, Stigmeidae and Phytoseiidae, PL-480 Project on mites. University of Agriculture, Lyallpur, 250 pp.
- Gonzalez RH (1977) The tetranychoid mites of Chile: The subfamily Bryobinae (Acari: Tetranychidae). *Acarologia* 4: 633–653
- Gutierrez J (1985) Spider Mites their Biology, Natural Enemies and Control. Vol. 1A 1.1.4. Elsevier Science Publisher, BV, Amsterdam, 75–90.
- Lindquist EE (1985) External anatomy. In: Helle W, Sabelis MW (Eds) *Spider Mites – Their biology, natural enemies and control*. Vol 1 A. Elsevier Science Publishing, Amsterdam, 3–28.
- Martin H (1972) Report to the government of Saudi Arabia on research in plant protection, 38 pp.
- Meyer MKPS (1974) A revision of Tetranychidae of Africa (Acari) with a key to the genera of the world. *Entomology Memoir, Department of Agriculture and Water Supply* 36: 1–291.
- Meyer MKPS (1987) African Tetranychidae (Acari: Prostigmata) with reference to the world genera. *Entomology Memoir, Department of Agriculture and Water Supply* 69: 1–175.
- Meyer MKPS (1996) On some spider mites of (Acari: Tetranychidae) of Yemen. *Fauna of Saudi Arabia* 15: 5–19.
- Migeon A, Flechtmann CHW (2004) First additions and corrections to the world catalogue of spider mite family (Acari: Tetranychidae). *International Journal of Acarology* 30(2): 143–152. doi: 10.1080/01647950408684383
- Pritchard AE, Baker EW (1955) A revision of spider mite family Tetranychidae. *Pacific Coast Entomological Society Memorial* 2: 1–472.
- Smiley RL, Baker EW (1995) A report on some tetranychid mites (Acari: Prostigmata) from Yemen. *International Journal of Acarology* 21(3): 135–164. doi: 10.1080/01647959508684055
- Toroitich FJ, Ueckermann EA, Theron PD, Knapp M (2009) The tetranychid mites (Acari: Tetranychidae) of Kenya and a redescription of the species *Peltanobia erasmusi* Meyer (Acari: Tetranychidae) based on males. *Zootaxa* 2176: 33–47.
- Tuttle DM, Baker EW (1964) The spider mites of Arizona. *University of Arizona Technical Bulletin* 158: 1–44.
- Tuttle DM, Baker EW (1968) Spider mites of south-western United States and a revision of the family Tetranychidae. University of Arizona Press, 143 pp.
- Wainstein BA (1960) Tetranychoid mites of Kazakhstan (with revision of the family). Trudy Nauchno-Issled. Inst. Zashchita Rastenii Kazakh. 5: 1–276.